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SEPTICEMIA IN SWINE

A METHOD OF INTESTINAL ANASTOMOSIS

ORIGINAL RESEARCH FACTS ON DERMATITIS

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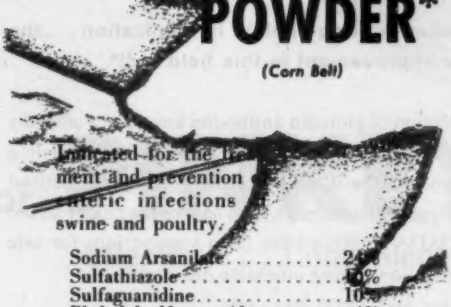

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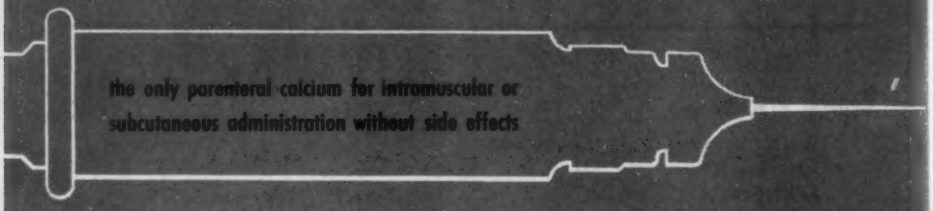

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NEWS COMMENT

Antibody Milk For Sale

Antibody milk, a controversial subject with research investigators has been introduced commercially in Iowa. Called IMPRO, it is being produced by Collins Products, Inc., Waukon, Iowa. Pharmacists in six Iowa cities are handling the product for relief of arthritis pain.

Collins plans to have a milk aimed at hay fever ready for the coming season. Frozen for storage, the product is marketed in 2 qt. cartons at $2.20 per carton. This development follows along the lines of early work by W. E. Petersen, University of Minnesota on the phenomenon of antibody secretion following infusion of an antigen into the udder.

Plastic Cornea Transplants

Medical investigators at the Massachusetts Eye and Ear Infirmary have succeeded in making and transplanting plastic cornea replacements in the eyes of rabbits and monkeys. Preparation of the discs constitutes almost as complicated a problem as surgical implantation, a technic that has taken 10 years to reach this stage of development.

Calves Need Fat

Addition of 30% lard to milk replacers doubled growth of calves for the first 28 days in Minnesota trials. As calves become older the extra fat becomes less important. Calves getting no fat had more trouble with scours.

Queen Bee

Incorporation of antibiotics has extended to artificial insemination of the queen bee. University of Wisconsin scientists have found streptomycin incorporated into semen lowers the number of queen deaths nearly 90% and doesn't affect the queen's ability to produce fertile eggs. Their method involves loading a syringe with semen and then drawing streptomycin solution before the queens are inseminated.

Hardware Disease In Bulls

Observations at the Central Ohio Breeding Association Bull Stud serve as a reminder that foreign body problems are not restricted to female ruminants. Several years of following bulls to autopsy revealed the fairly common relationship of foreign body penetration and lowered fertility. Bulls did not go off feed noticeably or demonstrate other symptoms of acute sickness.

Only noticeable symptoms were that normally active bulls would slow down in mounting accompanied by a difference in semen quality.

Examination with the metal detector and rumenotomy has prolonged the usefulness of several animals.

Chicken Hot Dogs

Cornell University investigators have come to the aid of the poultry industry with development of a hot dog made from chicken. It is reported to cost less than the standard variety with equal nutrition.

Ingredients include poultry seasoning, dried skim milk, soya and fat. In processing, meat is cut into particles the size of a grain of sand by a blade that whirls 5,000 times a minute. Remaining ingredients are then mixed in.

Johne's Disease Vaccine

Long range ARS studies deal with the problem of producing a vaccine to control Johne's disease and not interfere with nationwide tuberculosis eradication programs. Some vaccines seem to provide serviceable immunity but vaccinates tend to give false positives to the tuberculin test.

It is hoped that further studies will yield a vaccine to protect highly susceptible young stock although it may dwindle as the animals grow older and they are better able to resist infection.

Intestinal Resection

Michigan investigators report that dogs with two-thirds of the small intestine removed can survive and eat ordinary food with no ill effects. Resection of 75% or more causes diarrhea and death from starvation within three months. However, 80 to 90% of the small bowel can be removed with survival and weight maintenance if one to two inches of the distal segment of remaining bowel is reversed and reinserted into the intestine to function in an antiperistaltic manner.

The procedure should have application in mesenteric thrombosis of man and animals.

V

Here each month are published ideas, suggestions and comments picked up by VM reporters at veterinary meetings

The Meeting Circuit

Anaplasmosis

While clinical manifestations of anaplasmosis constitute a helpful means in field diagnosis, confirmation is obtained by demonstration of the marginal bodies in properly prepared and stained blood films. Carrier cattle cannot be differentiated clinically from non-infected animals, and anaplasma usually cannot be demonstrated in blood films stained in accordance with presently used methods.

In a controlled experiment, a vaccine consisting of physically disintegrated and formalin inactivated material including 20 adults and 30 young cattle, varying degrees of clinical immunity were manifested in all vaccinated animals. Forty percent of young vaccinated animals lost detectable complement fixing antibodies at four weeks following challenge, whereas those remaining continued as serologically positive healthy carriers. This vaccine is under further field studies.

Numerous drugs have been employed in an effort to cure or prevent anaplasmosis. The drugs most widely used consist of arsenicals, antimalarials, antimony derivatives and dyes. While it is evident that the tetracycline group of antibiotics possess therapeutic value in bovine anaplasmosis, the expense of these preparations limits their use in routine practice. For this reason the quantity of the broad spectrum antibiotic administered for therapeutic purposes against acute infection usually is such as to produce only a suppression of the agent. Consequently, the animal becomes a carrier capable of spreading anaplasmosis.—*Miodrag Ristic, D.V.M., Florida State Meeting 1959.*

Mastitis at Drying Time

Reduction of feed intake of cows in heavy milk flow at drying off time is important to control of mastitis, according to the British National Institute of Research in Dairying. In tests with about 100 cows, it was found that more cows became infected in the first 21 days of the dry period than in the entire term preceding lactation. Evidence indicates that the more milk a cow is giving when starting the drying process, the greater the chance of mastitis infection. This research group recommended dipping teats in 5% tincture of iodine twice within 24 hours after the last milking of a cow being dried up.—*Agriculture Leaders Digest*

Organic Phosphorus Compounds

Among the most promising new pesticides for poultry are the organic phosphorus compounds, most of which are still under study for positive results against insects, harmful side effects, and residues they may leave.

Malathion, an organic phosphorus compound, is effective when used against lice and some mites, as well as the fowl tick and the ordinary flea. New compounds such as

Dipterex, Dicapthon, Chlorothion, Diazinon, Dow ET-57 and Bayer 21/199 have proved out well in preliminary tests. Lindane is still proving out well in poultry houses. DDT has been abandoned because of undesirable residual chemicals in the meat.

Examination of the Mare

Should maiden mares be examined rectally and/or by speculum before they are bred? Please relate methods and theory of examination.

In a large percentage of maiden mares an examination probably would not reveal anything. But we would at least have on record some things which might give us trouble, such as infantile genital tracts, which means the reproductive tract is not developed enough to function normally. As for maiden mares, some of them high-priced, that are going to be bred to high-priced stallions, you would want to have this information before you decide on breeding them to any particular stallion. I usually use a speculum at the time I examine a maiden mare. The only reason is to open her up. If an examination is being made at the race track for a prospective broodmare, I don't consider a speculum necessary as it would probably involve suturing the mare to keep her from sucking air.—*Dr. W. R. McGee*

Do you feed barren mares (with "regular" feed) in any special sort of way, prior to and during the breeding season, in order to improve their breeding efficiency? What "regular" feed do you use? Do you want barren mares thin, medium, or fat for breeding? What vitamin or mineral supplements do you use? Why? Do you feed maiden mares any differently? Why? Do you want them thin, medium, or fat for breeding?

When you have barren mares coming to your farm it's pretty hard to tell what they are going to look like. Some are going to be fat, some are going to be thin, and some will be medium. I would prefer a barren mare to be medium in flesh, rather than to be overly fat, but I believe I would prefer her to be a little fat than to be emaciated looking. I believe that generally speaking, if a mare is in good health, she's going to have a lot more breeding efficiency. I use regular feed, as a rule, and I like to see a barren mare, or a maiden mare, generally on the improve as they come into the breeding season. As far as vitamins and mineral supplements are concerned, if I think a mare has anything particularly wrong, if she's not breeding well, I will usually have the veterinarian check her, maybe run a blood test on her and so on, and take his advice as to any supplementary foods she may need. Top quality oats, grain, good hay, and maybe alfalfa is all right for most any mare. I don't have a shed, I have a barn, so consequently, I feed the mares in the morning and in the afternoon. Later on in the breeding season, when the grass gets green, I leave them out pretty much and I give them food in the morning only. I think there is nothing like exercise for them and of course the sunshine and green is wonderful for them. That just about covers it.—*Ralph Kercheval*

What is meant by "opening up" a maiden mare before breeding? Should she be opened, and if so, how long in advance of being bred?

I doubt seriously that the average maiden mare of necessity would have to be opened. If the hymen is thick or imperfect, or a speculum examination indicates that being bred by the stallion will cause a rupture of this hymen and cause undue bleeding, there's a possibility of infection following the wound caused by the act of breeding. It is a common practice to introduce a vaginal speculum and a hand in a sterile glove to make sure that the opening into the interior part of the vagina is large enough to accommodate the horse. I think it should be done at least 30 days prior to breeding so that any tearing that does occur by this manual opening has a chance to heal, and there isn't a raw or infected wound present when the mare is actually covered.—*Dr. K. L. Proctor*

Practitioner's Laboratory

NITRATE POISONING

WM. L. SIPPEL, V.M.D., Ph.D.
Florida Livestock Board
Kissimmee, Fla.

The sources of nitrate poisonings are numerous and include chemical fertilizers, cereal grasses, weeds, corn, sudan, ponds or wells receiving drainage from highly fertilized fields or feed lots, ensilage, beet pulp, and many others. Nitrate poisoning should be considered in cattle exhibiting unexplained drops in milk production or abortions[1] from which infectious agents can not be recovered. People and animals have been poisoned by exposure to nitrogen dioxide fumes in silos or drainage therefrom. For an excellent review of the nitrate poisoning problem see Case's articles[2,3] from which the following test was obtained:

Reagents:[4] Diphenylamine—500 mg.
Water—20 ml.
q. s. conc. sulfuric acid—100 ml.

The diphenylamine is dissolved in water and sulfuric acid added cautiously. The solution is cooled and stored in a brown bottle[5]. For field tests, the solution is used half strength (diluted with water). Needless to say, this acid solution is very corrosive and should be handled with the caution due strong acids.

Technic

Plant material can be tested by mincing the leaves and/or stems finely and dropping the test solution directly onto it. In positive cases a blue color develops. The depth of color and rapidity with which it develops are indications of the amount of nitrate present. Kohnke[6] indicates that stems and cross sections of the leaves are the areas of choice for testing. Touching the freshly cut plant tissue in the reagent, allowing it to react for 10-15 seconds and then touching it to a white paper towel makes the color easy to observe.

An alternative procedure is to extract the minced plant tissue with water and to perform the test on the resulting solution. Protein-free filtrates of blood serum, other tissues, or stomach contents, can be tested in this manner. Full strength reagent should be used for these types of examinations according to Case[3].

(continued on page 26)

Thanks are due Dr. A. A. Case for review of this article and for his helpful suggestions.

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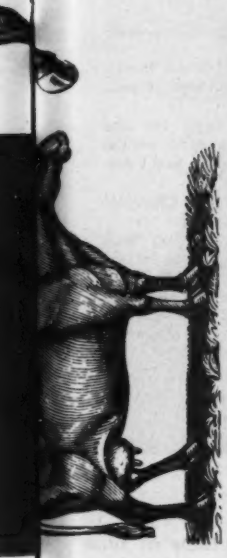

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*Willis, T. Ellsworth: Clinical Experiences with a New Glucocorticoid, *Veterinary Medicine* 54:489 (September) 1959.

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(continued from page 23)

The development of a greenish color indicates the presence of nitrites and requires a different test. Colors other than blue or green can be ignored.

We have observed cases of nitrate and/or hypomagnesemia poisoning in cattle on oat pastures in winter and early spring months to be more frequent following prolonged periods of overcast skies. Kohnke[5] indicates that plants use up available nitrogen more rapidly during the photosynthesis resulting from sunlight; thus cloudy weather would result in higher nitrate values in grasses.

Garner[6] has indicated that 0.5% of nitrate expressed as KNO_3 on an oven-dry basis in the total diet is about the upper limit of the safe range and subclinical or frank nitrate poisoning can be expected with amounts in excess of this figure.

Garner gives the following table and toxicity information:

Level of KNO_3 on Dry Matter	*Animal Response*
.0-0.5%	Normal if on an adequate ration.
0.6-1.0%	Milk production drops. Slowly at first, increasing after sixth to eighth week. Typical Vit. A deficiency symptoms in 6th to 8th week.
1.0-1.5%	Milk production loss within 4 or 5 days. Reproduction difficulties over the period fed and may extend over several weeks after the removal of the feed.
1.5% plus	Death; usually several head and suddenly.

Case[7] has indicated that nitrite is at least ten times as active as the nitrate ion. He states that if there is a regular and constant level of nitrite in the water supply at a fixed level of 5 parts per million or more, vitamin A metabolism will be upset leading to such symptoms as abortion, sterility, poor performance and other ills probably due to vitamin A deficiency. Many animals so damaged never fully recover.

Interpretation

This test is only roughly quantitative but has been found very useful in the field.

In speaking of this test for nitrates in plant tissues, Kohnke[5] states "A dark blue color indicates an abundant or excessive nitrogen supply; a pale blue or green color an adequate supply; and no color, accompanied by a pale green color of the foliage, a deficient supply." In animal poisonings, the critical factor is the total amount of nitrate ingested, so a representative sample of the forage must be tested.

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Bluetongue of Sheep

Some of the clinical symptoms of bluetongue of sheep are edema of the lips, tongue and the lower jaw, with mucopurulent rhinitis followed later by exfoliation of the affected tissues. An almost characteristic symptom is a pododermatitis and coronitis following the nose and mouth symptoms, affecting one or more feet in which there are hemorrhages of the tissues under the horny parts. Vaccination is quite successful though since the disease may be due to a plurality of strains—these appear to have changing phases—the vaccine is at times disappointing, but in the present stage of knowledge it is the only method of control. It is believed that the disease is spread by insect vectors since contact infections are unknown. — *R. R. Dykstra D.V.M.*

WHAT IS A FAIR RETAINER FEE?

JOHN HERRICK, D.V.M.
Extension Veterinarian
Iowa State University
Ames, Iowa

Speakers at many veterinary meetings have discussed the feasibility of the procedure of veterinarians offering their services on a prearranged fee basis aimed at preventive medicine and herd management in lieu of the present practice of "rescue the perishing." This has met with disapproval by many and in others, it has prompted the questions, "How do I go about it?" or "What do I charge?" In other words, there is no guide line for a practicing veterinarian to contrast veterinary service or to render professional service on a "retainer" basis.

Fundamentally, the reason for the interest in offering veterinary services in

this manner is the development of large production units such as cow pools or contract feeding operations and large integrated units. In larger units, economy and efficiency must exist; thus, strict measures are mandatory. Possibly the biggest void in veterinary medicine is the failure of appreciation and knowledge of animal production economics; the need for further information by both the practitioner and the veterinary student in nutrition, animal management, genetics and housing and most vividly, the failure to inform the livestock producer on the value of preventative medicine. In other words, the practitioner has not on his finger tips the figures on the cost of producing a 400 pound beef calf, cost of wintering a beef cow, increase in production from a herd where mastitis has been controlled, cost of producing 100 pounds of pork, estimated cost of veterinary service to produce a pig to market. These figures must be available if a practitioner is going to convince a large animal production unit that his services should be on the prevention of diseases instead of being called as a last resort for professional guidance. These figures are not always available because there are too few studies to show the increase in production or profit from an "all out" health program.

In order to obtain such information, the author, through an extensive questionnaire, polled veterinary associations, state veterinarians and extension veterinarians in all of the states. The questions centered around whether or not practitioners were doing a large animal practice on a prearranged fee basis, the number of practitioners on such a basis, and approximate fee or arrangement for different species of livestock. The response to the questionnaire revealed that only a few veterinarians are conducting such a practice arrangement at the present time. Veterinarians in 14 different states are conducting a portion of their practice on a prearranged fee basis, yet only three or four veterinarians in each state were reported to be operating on such a basis.

Undoubtedly, there are many more than were reported, or whose activities are not known. Possibly, many veterinarians, if operating on such a system, would hesitate in divulging such information.

Sixteen State Veterinary Associations, including the Province of Ontario in Canada, indicated they are conducting such a survey or plan or doing so in the near future. Apparently, considerable interest exists in the subject in several different states. Conditions vary extensively between states and between units within a state; therefore, considerable study must take place in order to establish guide lines for practitioners.

One question asked veterinarians was what in their opinion should be allocated as fixed costs in a health program in various species of livestock. In swine, the range was from 50 cents to $2.00 per head. In feeder cattle the range was 75 cents to $2.00, while in beef cattle the range was from $1.00 to $3.50 per head per year. Dairy cattle estimates ranged from $3.00 per cow per year to $1.00 per month per cow plus drugs and the price of emergency calls.

Fixed costs for health supervision of poultry ranged from service calls to ½ to 1½ cents a bird. This included service, treatment, and diagnosis but not the cost of drugs. It is readily observable that there is extreme variation in the size of fees for the same service.

One veterinarian reported he had contracted an all out health program for a beef herd, at $2.50 per cow per year. This included pregnancy examination, male fertility examination, parasite control, dehorning, castration, and vaccination for brucellosis and blackleg. He now has raised the fee to $3.50 with a number of ranchers interested in the proposition.

It appears that state associations, district associations and possibly individual veterinarians should consult with agricultural economists on the economics of livestock production. This will enable the veterinarian to have a knowledge of the cost of production, thus he can more easily demonstrate the value of certain health measures.

The challenge to the profession is great in that none of the larger units of live-

stock production are attempting to design and implement their own health program without a veterinarian's aid. Recently a contest to select the leading livestock producer by a national organization was reviewed. One of the leading criteria suggested to the judges of the contest was whether or not the candidate did his own veterinary work. One judge was elated to find one candidate could operate on his "cancer eyes" himself. Bluntly, we haven't approached the livestock producer with facts, figures and statistics of the value of a health program designed to prevent disease.

Facts are urgently needed by the profession. Submit your experiences and thoughts on pre-arranged fees on this form and send to VETERINARY MEDICINE, *803 Livestock Exchange Bldg., Kansas City, Missouri. Results will be tabulated and presented in future issues.*

cut on dotted line

1. Are you rendering service on a pre-arranged fee basis?

_____

2. Do you plan to try this type of service?_____

3. Do you like a price per head fee basis?_____

What price? Cattle_____

Swine_____ Beef cattle_____

What should this service include?_____

_____

Should drug costs be extra?_____

What should the price per head not include?_____

_____

4. Would you consider rendering professional service on a percent of the net basis?_____

5. What other type of pre-arranged fee basis would you suggest? _____

_____

_____

6. In your opinion, what should an owner allocate as fixed costs for a health program for swine?_____ beef cattle?_____ feeder cattle?_____ milk cows?_____

7. Do you have figures on the savings a producer may earn or save by adapting an "all out" health program? Please explain.

Your state_____

SEPTICEMIA IN SWINE

W. L. BAKER, JR., B.S., D.V.M.
Kennett, Missouri

THIS REPORT describes an outbreak of streptococcic septicemia in swine in southeast Missouri. The condition itself can be readily confused with acute erysipelas, acute salmonellosis or pasteurellosis, and in many cases can be differentiated only by culture. The purpose of this report is to summarize the results of the disease as it appeared in one herd, including history, clinical signs, necropsy and laboratory findings, and treatment.

History

A herd consisting of 200 Hampshire shoats, weighing nearly 125 lb. each, had been purchased at a feeder sale a month previously. At eight weeks of age they had been immunized against hog cholera with modified live virus, porcine origin. The animals had been castrated at six weeks of age. After arrival at the feedlot, the pigs were immunized against swine erysipelas with live avirulent culture and given a mixed bacterin porcine formula 1, which contained *Pasteurella multocida*, Salomonella, streptococci (pyogenic) and Corynebacterium. Two weeks later they were given a second injection of mixed bacterin.

On arrival the herd was checked for internal parasites. Fecal examination revealed moderate infection of roundworms. One week after immunization against swine erysipelas, the hogs were wormed with piperazine. This was repeated in two weeks. The herd was also sprayed for external parasites.

Upon the practitioner's arrival, the owner reported that he had not noticed any animal since the preceding day, at which time he had found 12 sick animals. He treated these himself with penicillin. By the following morning about 40 animals were sick and four of the original 12 were dead.

Symptoms

On stirring animals from their bedding, a pronounced coughing was noticed. Several exhibited an incoordinated gait, especially in hind quarters. Three of the animals that had sickened the day before were weak and prostrate. Temperatures of the obviously sick animals ranged from 105 F. to 108.5 F. Temperatures of some of the animals that looked normal ran as high as 106 F. Respiration was

greatly accelerated in sick animals.

After the animals had been disturbed, most of them went to the self feeders to eat and to the automatic waterers before returning to the bedding. Many of the animals running temperatures of 106 F. to 108 F. ate rather vigorously. The owner remarked that in the preceding 24 hours the herd had consumed almost a normal amount of feed.

About 10% of the animals were exhibiting a light colored diarrhea. Two or three had bloody urine. Within 72 hours, 75% of the animals had elevated temperatures and other symptoms.

Necropsy Findings

At autopsy, patchy and scattered areas of consolidation in the different lobes were observed. The lungs were distended, quite firm and did not collapse when the thorax was opened. Varying amounts of edema were present in the interlobular spaces. Both petechia and ecchymosis were found in the serous and mucous membranes of the gastrointestinal tract, the pericardium and the lungs. The mediastinal lymph nodes and other lymph nodes of the body were swollen and hemorrhagic.

Later animals autopsied showed more consolidation of the lungs and the edema was more prominent in the lungs and bronchi. The kidneys, ureters and bladder were dark and hemorrhagic.

Laboratory Findings

A white blood count was run on four of the animals showing acute symptoms. All gave counts of 20,000 or more, which pretty well eliminated the possibility of peracute hog cholera or a virus type of pneumonia. The extensive bilateral pneumonia, showing consolidation and interlobular edema, suggested pasteurellosis, as did the white blood count, but a larger percentage of animals were affected than is usually seen in pasteurellosis. Both autopsy findings and blood count suggested the possibility of acute salmonellosis or acute swine erysipelas.

Tissue and blood samples were obtained and were cultured on brain heart infusion agar. As soon as growth was obtained on incubation, a Gram's stain was run and identification of organisms made. The culture was then sent to a laboratory for confirmation. Organisms present were *Streptococcus fecalis* and *Streptococcus zooepidemicus.*

The sensitivity interpretation pattern showed these organisms were resistant to streptomycin and dihydrostreptomycin and magnamycin. They were slightly sensitive to erythromycin, polymyxin B, tetracycline and oxytetracycline.

They were sensitive to bacitracin, penicillin and triple sulfa.

They were very sensitive to neomycin, neomycin and polymyxin B, and chloromycetin.

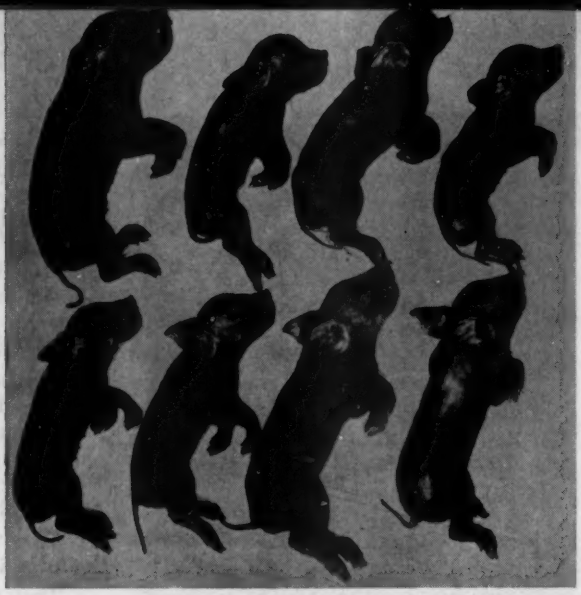
Treatment

The entire herd was placed on a triple sulfa in the drinking water. This was continued for six days. Animals showing acute symptoms were given one 2 cc. injection of Daribiotic injectable (neomycin and polyxin B—S. E. Massengill) followed 12 hours later with 3 cc. of aqueous penicillin. Animals were disturbed as little as possible, and injections were made in the neck muscle with the animal in a recumbent position whenever possible.

After the animals were taken off triple sulfa they were given one-half ounce cuprous iodide per hundred pounds body weight in the feed for five days. This was given for its action as an expectorant and resolvent. Twelve animals died in the first 72 hours. Three others were later destroyed as chronic lungers.

Summary

History, clinical signs, necropsy and laboratory findings and treatment are given for an acute outbreak of *Streptococci septicemia* in swine. The most outstanding symptoms involved the lungs and a general septicemia.



Pigs born blind due to a Vitamin A deficiency in the sow's ration. Other abnormalities observed were lack of eyeballs, harelips, cleft palates, misplaced kidneys, and accessory ear-like growths.

Courtesy Fred Hale, Texas Agr. Expr. Station

DISEASES OF THE FARROWING SOW

Directly or Indirectly Affecting Baby Pigs

Part Five

C. L. VICKERS
Columbia, South Carolina

Brucellosis is one of the major diseases causing abortion, premature birth, or birth of weak or dead pigs.

Brucellosis

Cause. *Brucella suis* is the chief cause, but it can also be caused by *Brucella abortus* and *Brucella melitensis.*

Age. Any age group may be affected.

Signs of the disease. Sows generally manifest no visible signs of the infection. There may be a persistent uterine infection causing a vaginal discharge. The classical signs of brucellosis are abortions and birth of weak or stillborn pigs. Since abortions can occur as early as 22 days, the only evidence of trouble may be a return to estrus of sows known to have been pregnant.

Swollen joints and lameness may be noted in baby pigs with brucellosis. Lameness and posterior paralysis occasionally occur in sows. Newborn pigs may be weak and not survive. In some infected boars, orchitis develops as they approach or reach sexual maturity.

Any of the following changes may be noted on necropsy: abscess formation in the internal organs; multiple cysts in the uteri; abscess or necrosis of the intervertebral disc; inflammation of the uterine mucosa varying from congestion to catarrh; pyometra; nodular splenitis; nodular lesions in the liver, kidney and lymph glands; catarrhal inflammation or abscess of the tendon sheaths and joints.

Diagnosis. The disease may be diagnosed serologically by means of the tube or plate agglutination test. Agglutination titers are usually low in baby pigs.

The disease must be differentiated from leptospirosis, since both produce a similar syndrome.

Treatment. There is no treatment for brucellosis.

Prevention. For prevention and/or control, consult local livestock sanitary officials or consult the proceedings of the United States Livestock Sanitary Association for 1954.

Leptospirosis

Cause. Leptospirosis in swine is considered to be caused chiefly by *Leptospira pomona,* but other serotypes of Leptospira may infect swine.

Age Incidence. Any age group may be affected, but it is chiefly manifest by an infection in pregnant sows causing abortion or birth of weak pigs.

Signs of the Disease. The disease may be acute or chronic. In the acute form there may be sporadic deaths in a drove of swine.

The primary signs of the infection are abortions, or birth of weak or dead pigs. Abortions usually occur during late gestation, usually the last three weeks. Some full term pigs are born dead, or if living, die shortly after birth. Affected litters do poorly whereas the drove does satisfactorily. The signs in sows are: inappetence, nervousness, anorexia, fever, diarrhea, bloody urine, jaundice, anemia, abnormal milk and agalactia. Often sows abort without ever showing any evidence of illness. The signs in baby pigs are: icterus, hemoglobinuria, fever and inappetence.

The mortality in leptospirosis in other than baby pigs is not high. Leptospirosis is usually a mild disease which is inapparent. In some outbreaks, death loss due to abortion, stillbirth and weak pigs is quite high.

In the chronic form of the disease, the following lesions may be noted: edematous lymph nodes; pale kidneys; variable number of small grayish foci over the surface and cut surface and some foci are slightly elevated above the surface. The capsule is not adherent to the cortex.

Diagnosis. Diagnosis may be made by the plate-agglutination method, agglutination-lysis method, cultural methods and/or histological examinations. Occasionally, Leptospira may be demonstrated by dark field examination of the blood, urine or peritoneal or pleural fluid. Leptospirosis must be differentiated from brucellosis, eperythrozoonosis, toxoplasmosis, coal tar poisoning (pitch), crotalaria poisoning, mouldy corn poisoning and other conditions.

Treatment, Prevention and Control. To understand how to treat and control an outbreak of leptospirosis, certain facts must be known and considered. Leptospirosis is a self limiting disease, and recovery with complete elimination of the Leptospiras from the kidney usually occurs within five months after the initial infection. So, swine having the disease may recover, but still be able to spread the disease through the urine for as long as five months. Other species of livestock such as cattle may contract the disease and may also serve as carriers to spread the disease to swine. Rats are an important means of spreading leptospirosis. When Leptospiras are passed in the urine, they survive in moist areas for variable lengths of time. It has been shown they can survive for ten days or longer in surface water such as farm ponds.

Leptospirosis is spread from one animal to another by direct contact with infected urine from carrier animals such as hogs, cattle, or rats. It also is spread indirectly by susceptible animals drinking from water which has become contaminated or eating contaminated food, or by similar means.

Commercial bacterins or vaccines are now available to vaccinate animals against the disease. It has also been demonstrated that certain of the antibiotics are beneficial in the treatment and elimination of the carrier state of the disease.

With these facts in mind, a treatment and control program can be initiated when an outbreak occurs. The following steps might be undertaken with such

modifications as necessary to fit the condition.

1. Test by serological means to detect swine having the disease either in the active, recovery, or carrier stage. Segregate these animals.

2. Vaccinate swine that have become exposed to the disease. Vaccinate sows that have not yet farrowed. Revaccinate every six months until no new cases of infection occur. Revaccination should be accomplished before breeding if possible.

3. Any animals visibly ill from leptospirosis may be treated with antibiotics. Drugs that have been suggested as beneficial include oxytetracycline, erythromycin, tetracycline, and dihydrostreptomycin.

4. Keep sick and carrier animals separated from the remainder of the herd.

5. Keep various species such as cattle, swine, and goats separate.

6. Obtain replacement animals only from known Leptospira free herds.

7. Keep swine away from surface water such as ponds or streams.

8. Institute a rodent control program.

9. Under some condition of management, it may be advisable to use recommended antibiotics to assist in the elimination of carrier animals from a herd. Experimentally, the following drugs have been used to eliminate the carrier state of leptospirosis: Oxytetracycline at the rate of 400 gm. per ton of complete feed for 14 days; a single intramuscular injection of streptomycin at the rate of 10 mg. per kg. body weight.

Toxoplasmosis

Cause. Toxoplasma gondii, a protozoan parasite, is the responsible organism in cases of toxoplasmosis.

This disease causes abortions and birth of weak or premature pigs. It has been discussed more fully under diseases affecting baby pigs in an earlier part of this report.

Other Causes of Abortions in Sows

Almost any infectious disease can be the cause of abortions in sows. Erysipelas and swine influenza may cause death of fetuses and abortions or stillbirths. Anemia diseases such as eperythrozoonosis may cause abortions. Listerosis also causes abortions. Grazing pastures heavily fertilized with nitrate may cause sows to abort.

Iodine Deficiency

Cause. A deficiency of iodine in the sow's diet is the cause of this condition.

Signs of the Disease. Sows farrowing litters that are hairless. Only a part or all of the litter may be affected. The pigs are usually dead at birth, but some may be born alive and die shortly afterward. The litter is usually carried full term or even beyond. In affected pigs, the skin of the head, neck and shoulders is pulpy and edematous. In borderline deficiencies, pigs may be born alive, but weak. Again, only a few pigs, or all the pigs in a litter may be involved.

The thyroid gland is hemorrhagic and enlarged, varying in size from that of a pea to a marble.

Treatment and Prevention. Iodized salt in the sow's ration, or 3 grains of sodium or potassium iodide weekly per sow is both a preventive and a treatment.

Vitamin A Deficiency in Sows

In this condition, pigs may be born dead or die shortly after birth, or may be noted with a variety of eye defects including blindness. They are often born alive and full term, and except for eye defects, there are few clinical abnormalities. In pregnant gilts, the fetuses may be reabsorbed.

Actinomycotic Infections

Cause. If the disease is caused by Actinobacillus spp., it is termed actinobacillosis. If it is caused by *Actinomyces bovis,* it is called actinomycosis. Botryomycosis is the name given the disease when it is caused by Staphylococcus spp. Corynebacterium spp. may also cause a similar disease.

Predisposing Causes. This condition is predisposed by wounds such as inflicted by the fighting of baby pigs during nursing time.

Signs of the Disease. The various infective agents mentioned under the cause

are capable of causing abscess formation on the mammary gland of the sow. These abscesses may open and drain. Some abscesses may enlarge into tumor-like masses. The mortality rate is low. An accurate diagnosis depends on culturing the causative organism from the affected tissue, although a stained smear of the exudate from an abscess may give a lead as to the cause.

Treatment. The abscess may be opened and drained and then packed with an iodine pack. Lugol's solution may be injected into the abscess. An organic iodide fed systematically may be beneficial. In some cases, surgical removal is indicated.

Agalactia

Cause. Agalactia is often a reflection of some other disease condition. Any of the following conditions may result in agalactia: excessively fat condition of the sow; excess carbohydrate and low protein intake; parasites; sexual excitement (sows may come in heat as early as five days following farrowing); poor rations during gestation; chronic deficiency of some mineral or vitamin; metritis; nervousness; constipation; dystocia with resultant exhaustion; hormonal imbalance; diseases of the pigs resulting in a failure to nurse; hypocalcemia; lack of exercise; ergotism; retained placenta; and environmental changes or extremes such as very hot weather or chilling during farrowing. Infectious diseases, particularly Leptospirosis, may cause agalactia.

Signs of the Disease. The condition may appear any time following farrowing, usually within two or three days. In simple agalactia due to environmental changes or poor diet, there may be only a failure of milk secretion with no temperature rise. The sows refuse to eat and manifest a complete disregard for the litter.

In agalactia due to other causes, many or all of the following signs may be seen: pigs seem to be hungry and in various stages of starvation; the sows are uneasy; they may lie in a sternal position and do not roll over for the pigs to nurse; other sows may allow the pigs to nurse, but the udder contains no milk; anorexia is partial to complete; the temperature varies from normal to 105 F. Sows are depressed and do not get up unless forced to do so; the udder is firm and congested, but the teats are flaccid; little or no milk can be squeezed from the teats; if a toxemia is present, the sows tremble; a copious white discharge from the vulva may be noted 24 hours post partum; bowel movements are usually absent, or scanty and dry. A high temperature is usually found in those sows having agalactia due to extreme hot weather.

The mortality in sows with agalactia is usually low, but depends entirely on the cause. Necropsy findings would also depend on the cause of the agalactia.

Treatment. Cases of simple agalactia may often be corrected by merely introducing the arm into the uterus or administering a vaginal flush or inserting a hypodermic needle subcutaneously. Correct treatment depends on determining the cause. However, posterior pituitary extract by hypodermic injection is almost a universal treatment. Relief obtained by this injection may be only temporary and if it fails, chorionic gonadotropin may effect relief. If the sow is constipated, 2 or 3 ml. of Lentin intravenously or subcutaneously behind the ear usually relieves this condition. Other laxatives of choice may be used. In extreme cases, a high enema may be necessary to relieve constipation. The pigs should be taken off the sow and hand fed or placed on a foster mother until the condition is corrected.

Prevention. Attention to the diet and environment must be considered in any preventive program.

Cannibalism

Causes. Among the causes of the condition characterized as viciousness in sows, wolfy sows, and hysteria, that have been mentioned are: inherent disposition; lack of contact with a caretaker during pregnancy; mammary dysfunction (agalactia); psychic dysfunction; failure to remove afterbirth; fright; thirst; and chronic deficiency of certain vitamins or minerals. *(continued on page 86)*

Cyanacethydrazine, a relatively new drug showed marked promise in the treatment of lungworm in burros maintained for whole body irradiation studies. Need for additional study to determine the proper therapeutic dose and relative toxicity was defined by this preliminary study.

LUNGWORM INFECTION IN THE BURRO

RALPH E. THOMAS, D.V.M.
LARRY P. JONES, D.V.M.
Oak Ridge, Tennessee

CYANACETHYDRAZIDE (Dictycide—Fort Dodge Laboratories) has been reported[4] to be effective in treating cattle for *Dictyocaulus viviparus*, sheep and goats for *Dictyocaulus filaria*, *Protostrongylus rufescens* in sheep and *Metastrongylus apri* in pigs. No reports were found on the effectiveness of this compound in the equine species.

Hutyra *et al.*,[3] in discussing lungworm infections, state that only exceptionally are horses and asses affected. Yet, in a partial survey of our band of burros, only five of 90 appeared to be free of lungworms. Necropsies usually revealed lungworms in the lung tissue and air passages. These are identified as *Dictyocaulus arnfieldi*.[5]

Baker's[1] bibliography gives the distribution of this parasite as reported in the literature of United States origin prior to 1957.

Materials and Methods

From a band of 120 mature burros, 33 were selected for treatment. There were 11 jennets and 22 jacks. All were in

good health and weighed from 273 lb. to 507 lb. All of these animals were survivors of whole-body irradiation experiments and exhibited no clinical symptoms of lung-worm infections.

The criterion for treatment was that the animal must be shedding more than 20 live lungworm larvae per gram of feces. This determination was made by a modified Baerman technic:[4] 30 gm. of feces were thoroughly broken up and placed in cheese cloth on wire gauze. The sample was suspended for 24 hours in a funnel containing lukewarm water. The sediment collected in the attached centrifuge tube was spun at 2,000 r.p.m. for 20 minutes and all but the bottom sediment discarded. This fluid was placed on a ruled glass plate and a regular 3 by 1 in. glass slide was applied as a coverslip. The larvae were counted using a 30 x dissecting scope. The count was expressed as larvae/gm.

Treated animals were fasted for 18 hours prior to oral dosage and for four hours thereafter. Subsequently, fecal samples were collected from the rectum at 48, 72 and 120 hours and 16 days.

Cyanaçethydrazide was administered in its injectable and oral forms. The dosage recommended for cattle was used. Oral cyanacethydrazide was administered via stomach tube at the rate of 17.5 mg./kg. of body weight. The injectable form was administered subcutaneously immediately anterior to the right shoulder at the rate of 15.0 mg./kg. of body weight.

Ten animals received two doses with an interval of 24 hours between doses. In animals receiving the injectable drug the second dose was given contralaterally.

Experimental Results

The results obtained from the administration of cyanacethydrazide are summarized in table 1. The reasons for the 20% reduction of larvae reported are unknown. They may result from the sampling technic.

Since the animals used in this evaluation were survivors of whole-body irradiation, any drug which would alter the hemogram could not be used. The hematological picture was found to be within normal limits following administration of the drug in preliminary trials.

Discussion

The commercial brochure[3] states, "Oral, intramuscular or subcutaneous administration of the compound was found to remove mature lungworms and any larvae present in the airways. . . . The action of the drug is short-lived. Any worms not removed within about 8 hours of treatment remain in an apparently normal state of health and continue to reproduce." The number of larvae at 48 hours would then be expected to give an estimate of the normal reproducing lung-

TABLE 1. Summary of Field Trial With Cyanacethydrazide in the Burro

Number of Animals	Dosage	L.P.G.*—Percent Reduction at the Following Time Intervals Range/Average			
		48 hour	72 hour	120 hour	16 day
12	Oral	0-96	0-94	0-81	0-85
		36	49	41	48
11	Subcutaneous	16-100	0-100	50-100	0-93
		57	74	80	41
3	Oral-Two Doses**	0-85	0-60	35-100	54-82
		43	36	62	70
7	Subcutaneous-Two Doses**	9-100	0-86	37-86	33-73
		57	44	64	59
33	Over-all Mean	0-100	0-100	0-100	0-93
		48	55	61	50

*Larvae per gram of feces.

**1st dose administered 72 hours prior to 1st sampling; 2nd dose administered 48 hours prior to 1st sampling.

worms remaining after treatment.

The results based on cattle equivalent dosage were quite variable. The effectiveness of cyanacethydrazide varies with the individual burro. Cyanacethydrazide seems to be less toxic to the burro than to sheep or cattle but it is also apparently less efficient in burros when administered at the recommended cattle equivalent dosages. The authors are convinced that dosage levels need further evaluation in the equine species.

Wally[6] describes lacrimation in 15% of the animals, slight watery discharge from the nostrils in 30% and a slight increase in the rate and depth of respiration of those receiving therapeutic injections of cyanacethydrazide. He reports none of these symptoms following oral administration of therapeutic doses.

In the burros approximately 25% exhibited lacrimation following subcutaneous injection of therapeutic doses, but none of the other symptoms described above were noted. No symptoms were noted following the oral administration of therapeutic doses. Lacrimation was the only symptom noted in the animals receiving subcutaneous therapeutic doses on two consecutive days.

One burro was given 9.8 gm. of cyanacethydrazide, which is three times the oral therapeutic dose. There were none of the symptoms of intoxication, depression or inappetence reported[6] in other animals receiving a similar dose.

Sampling suggests that in a short while these animals will return to their initial parasite burden. This would tend to confirm the suggestion of others[7] that repeated treatment is required.

Summary

Cyanacethydrazide (Dictycide), a new drug for the treatment of lungworm infections in domestic animals, was evaluated for use in the burro. The drug was administered to a group of 33 adult burros orally or subcutaneously. The oral dosage was administered at a rate of 17.5 mg./kg. of body weight and the injectable solution was given at a rate of 15.0 mg./kg. of body weight. At 16 days post-treatment, approximately a 50% reduction in the number of larvae was demonstrated by the Baerman technic.

Cyanacethydrazide shows promise in the treatment of *Dictyocaulus arnfieldi* in burros. The dosages used were not sufficient to obtain complete removal of lungworms. Additional study is needed to determine the proper therapeutic dose and relative toxicity.

Acknowledgments

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Doctor Thomas is on assignment to the University of Tennessee-Atomic Energy Commission Agricultural Research Laboratory from the Veterinary Corps, United States Army.

Doctor Jones is a resident in veterinary pathology at the University of Tennessee-Atomic Energy Commission, Agricultural Research Laboratory.

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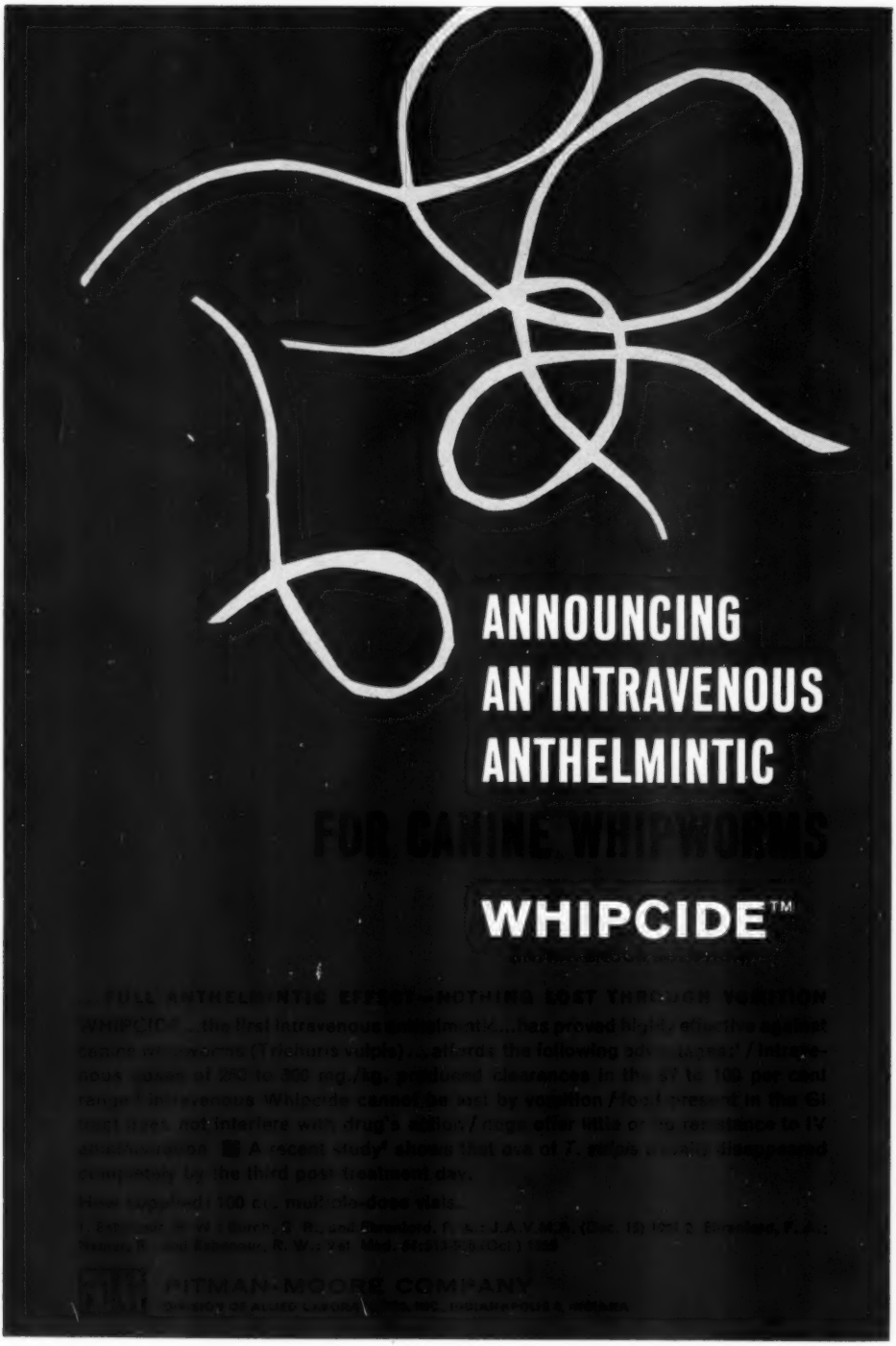
SMALL ANIMAL PRACTICE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A technic and the indications for a practical procedure of intestinal anastomosis are clearly and concisely presented. Illustration and explanation is such that the experienced surgeon can duplicate the procedure.

A METHOD OF END-TO-END INTESTINAL ANASTOMOSIS AND ITS APPLICATIONS

A. G. SCHILLER, D.V.M., M.S., D. MAKSIC, D.V.M.
L. C. HELPER, D.V.M. and E. SMALL, D.V.M.
Urbana, Illinois

INTESTINAL OBSTRUCTION by foreign bodies is usually corrected by enterotomy (radiograph 1). Sometimes, however, it may be necessary to remove a necrotic section of the intestine.

In a number of recent cases showing the clinical manifestations of bowel obstruction, it was necessary to resect from several inches to two feet of involved intestine. A common question is how much of the intestine can be removed without impairing the digestive processes or health of the animal. Kingma and Catcott[1] found that dogs could survive removal of 48% of the small intestine.

The writers have performed extensive enteroenterostomy in cases of sub-chronic intestinal intussusception (radiographs 2 and 3) and of adhesions of the small intestine (radiographs 4 and 5) resulting from chronic peritonitis. Occasionally, strangulation of the incarcerated intestine resulting from perforation of the mesentery may be an indication for this operation (radiograph 6). Enterostomy has seldom been performed in cases of hernias (radiographs 7 and 8).

To determine whether to do an enterotomy or an intestinal anastomosis sometimes constitutes a vexing problem. The writers found the criteria of Wangensteen[2] helpful in evaluating the viability of the involved bowel. The major factors for evaluation are the color, the presence or absence of pulsations in the mesenteric arteries and the contractility of the muscle of the intestine.

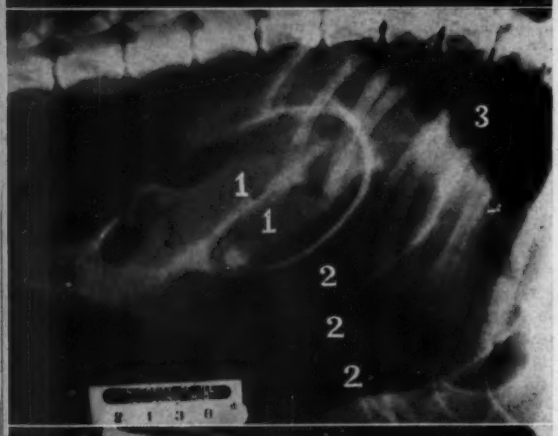
The surgeon's first reaction when he is confronted with an intussusception or an adherent mass is to separate the adhesions. This is often a difficult task, and excessive manipulation of intestines may produce considerable shock. The intestinal wall sometimes ruptures before the adhesions separate. If the surgeon is successful in separating the adhesions there may not be enough omentum to cover all of the denuded areas. The adhesions usually reform in a short time.

The writers believe that after finding

Radiograph 1—Lateral view of the abdomen of a dog taken 24 hours after feeding barium.

1. Stomach.
2. Distension of small intestine.
3. Foreign body (corn cob).

Note: The emptiness of the posterior abdomen and the lack of barium in the colon.



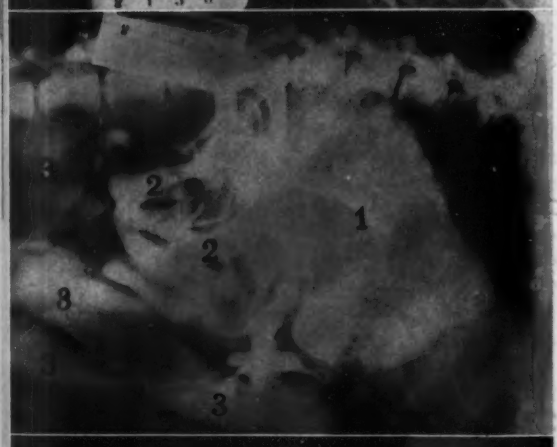
Radiograph 2—A survey radiograph of the abdomen of a dog.

1. Intussusception (ileum telescoped into the colon).
2. Distension of intestine due to gas.
3. Compression of stomach by distended intestine.

Radiograph 3—A lateral view of the abdomen of a dog taken 12 hours following the administration of barium. This is a case of intussusception of the ileum telescoped into the colon.

1. Stomach.
2. Small intestine.
3. Distension of small and large intestine.

The barium blankets the primary cause thus inhibiting a view of the intussusception.



Radiograph 4—A lateral view of the abdomen of a dog obtained 24 hours after repeated feeding of barium.

1. A convoluted mass of small intestine with remnants of barium in the lumen.
2. Colon.
3. Stomach.

The adhesions resulted from a gauze sponge left in the abdominal cavity following cesarean section.

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a normal piece of bowel entering the adherent mass and a normal piece leaving the mass, the entire adherent mass should be removed and the continuity of the digestive tract re-established. In cases of intussusception (radiographs 2 and 3) and of intestinal adhesions (radiographs 4 and 5), two to four feet of intestine have been removed. The removal of a large segment of the digestive tract is a radical procedure, yet it often provides the best chance for survival. The cases illustrated by radiographs 2, 3 and 4 made uneventful recoveries. The case illustrated by radiograph 5 succumbed, due to uremia, during the post-operative stage.

Radiograph 5—A lateral view of the abdomen of a dog six hours following the administration of barium.

1. A convoluted mass of small intestine with the remnants of the barium in the lumen.
2. The presence of barium in the colon.

The radiograph depicts the severity of the adhesions of the small intestine. There is no barium visible in the area between the involved intestine and the colon. The adhesions were the result of a previous enterotomy.

Radiograph 6—A survey radiograph of the lateral abdomen.

1. Small intestine is distended with gas as a result of incarceration and strangulation. The posterior portion of the abdominal cavity is empty.

Radiograph 7—A dorsal-lateral view of the posterior abdomen and medial aspects of the thigh. The radiograph was taken three hours after feeding barium meal.

1. The barium meal can be detected in the small intestine which has herniated through the femoral canal. The hernia was caused by trauma.
2. Stomach.

Radiograph 8—A lateral view of the thorax and abdomen taken three hours following the administration of barium.

1. The small intestine containing barium is herinated into the thoracic cavity.
2. Heart shadow barely visible.
3. Barium in the colon.

Materials and Methods

Warm, moist abdominal packs are placed around the affected portion of the bowel. The mesenteric blood vessels of the affected portion of the intestine are ligated and severed. Two Oschner forceps are placed side by side on each end of the segment to be removed. The intestine is severed between each of the two sets of forceps and the affected segment removed, leaving a forceps on each end of the normal bowel.

The two remaining forceps are grasped by an assistant and held so that the segments of the bowel are perpendicular to the abdomen and parallel to one another. Approximately 2 cm. from the cut

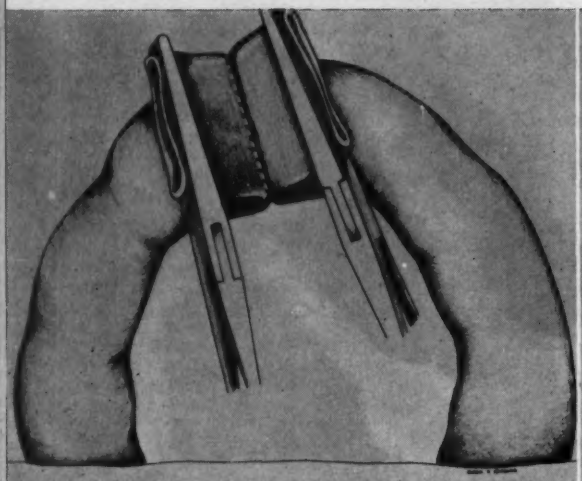

FIG.1
THE OUTER LAYER OF SUTURE HAS BEEN STARTED. (serosa to serosa continuous)

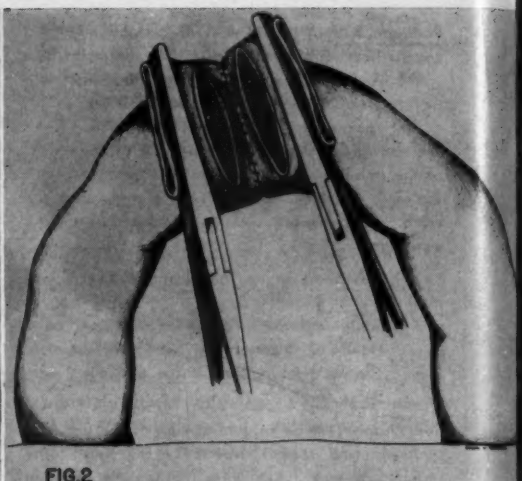

FIG.2
AN INCISION IS MADE BETWEEN THE SUTURE LINE AND THE FORCEPS INTO THE LUMEN OF THE INTESTINE.

ends, the walls of the two segments are sutured together, mucosa to mucosa, with a continuous suture using 00 catgut with a curved atraumatic needle (Figure 3).

An incision is made into the lumen of each segment of bowel. This incision is at right angles to the long axis of the bowel approximately 1 cm. from, and parallel to, the suture line. These incisions are made the same length as the suture line (Figure 4). The medial edges of the incisions are sutured with 00 chromic catgut, using a curved atraumatic needle. A Ford interlocking suture is used. The suture needle will be laid aside at the end of the suture line (Figure 5).

One-half of the anastomosis now has two rows of sutures, *i.e.*, a continuous and a Ford interlocking suture line.

The crushed portion of the ends of each segment is severed with a pair of scissors (Figure 4). The bowel can now be brought into an end-to-end position (Figure 5).

Suturing is continued, using a bell-type suture with the needle previously used on the Ford interlocking line of suture (Figure 6). The bell type consists of introducing the needle from the inside to the outside. The resulting effect is an inversion of the serosa. The suture line is continued to the point where the Ford interlocking line of suture began and the catgut is then tied. Simple interrupted sutures are then utilized to form the second or outside row of sutures from the front half of the anastomosis (Figure 7).

To determine whether a sufficient number of sutures has been used, pressure may be applied with the thumbs and index fingers to either side of the line of anastomosis. If pressure causes

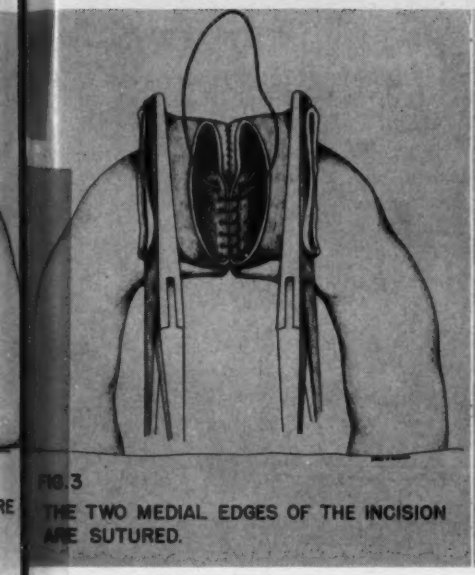

FIG. 3
THE TWO MEDIAL EDGES OF THE INCISION ARE SUTURED.

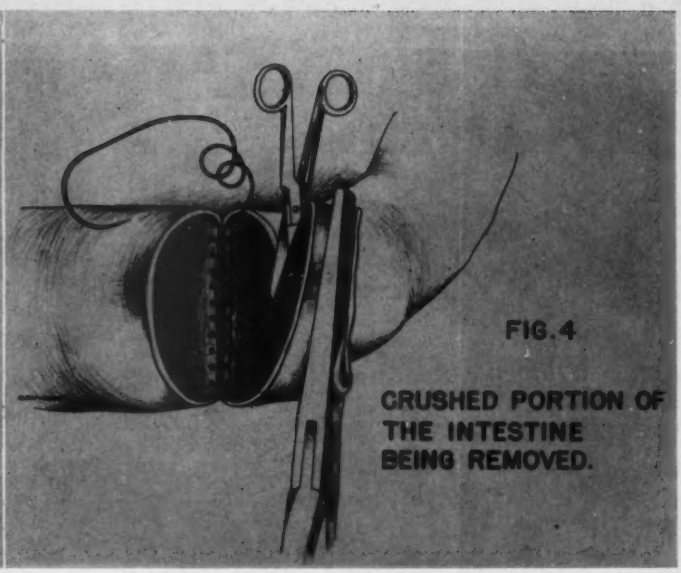

FIG. 4
CRUSHED PORTION OF THE INTESTINE BEING REMOVED.

leakage, another interrupted suture should be placed at this point. The anastomosis can now be brought to the edge of the abdominal cavity, rinsed with warm saline and replaced.

Discussion and Conclusions

Experience with this technique has indicated that covering the operative site with omentum is not necessary.

The technic* described has a number of advantages. First, no special forceps are needed. Second, no crushed tissue is sutured. Sir G. H. Makins[1] has described an intestinal suturing procedure which resembles the one described; however, in his technic the portion of the bowel crushed by the forceps is not removed. Third, a minimal amount of tissue is inverted and the intestinal lumen remains maximal in diameter.

*This technic was learned from Dr. Hindman, M.D., surgeon, Champaign, Illinois. Its origin is undetermined.

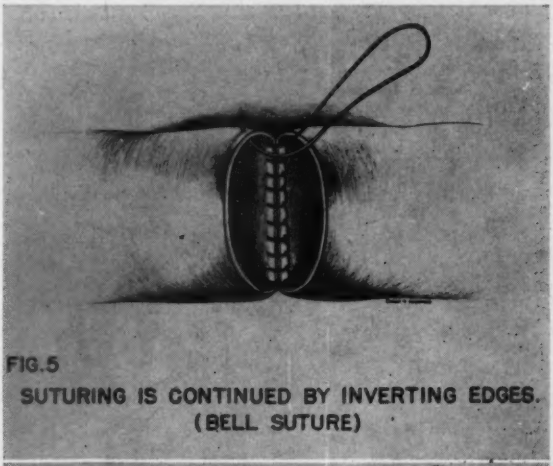

FIG. 5
SUTURING IS CONTINUED BY INVERTING EDGES. (BELL SUTURE)

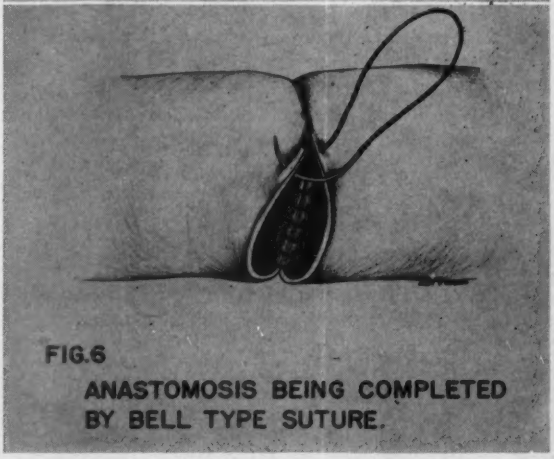

FIG. 6
ANASTOMOSIS BEING COMPLETED BY BELL TYPE SUTURE.

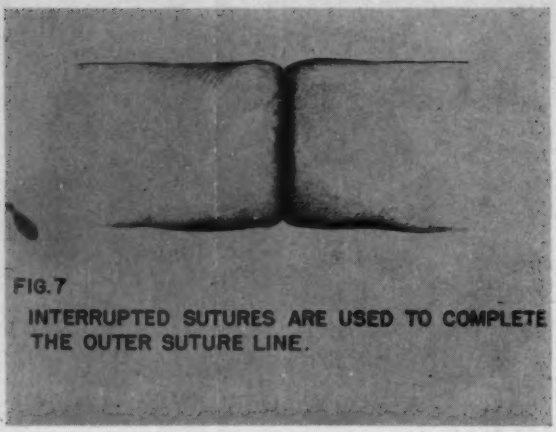

FIG. 7
INTERRUPTED SUTURES ARE USED TO COMPLETE THE OUTER SUTURE LINE.

Summary

Some of the indications for end-to-end intestinal anastomosis are discussed and a method for its accomplishment is described and illustrated. The good points of this technic are enumerated.

Acknowledgment

This report is from the Department of Veterinary Clinical Medicine, University of Illinois, Urbana, Illinois. It was presented at the American Animal Hospital Association Meeting, Colorado Springs, Colorado, May 5-9, 1959. The authors wish to acknowledge the assistance of Mrs. Helen Olson and Mrs. Shirley Harding in the preparation of the drawings.

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Diseases of Laboratory Animals Course By Armed Forces Institute of Pathology

The seventh annual course on Pathology of Diseases of Laboratory Animals, presented by the Armed Forces Institute of Pathology, Washington, D. C., is scheduled for presentation September 26-30, 1960.

The course is designed to provide training for scientists responsible for recognition and interpretation of lesions in experimental animals, or having charge of procurement and maintenance of animal colonies. It is intended particularly to help them interpret natural diseases which may negate experimental results or influence the supply of laboratory animals or their suitability for experimental use. Pathology will be the theme of the course but this fact will be used as a point of departure for discussion of etiology, diagnosis and control of the diseases under consideration.

The course will be of value only to those individuals qualified to understand disease processes and to absorb information in the field of pathology. Veterinary pathologists should find the course of particular benefit but pathologists, veterinarians and others with a similar professional background will also find the course of value.

Applications for attendance may be obtained by writing to: The Director, Armed Forces Institute of Pathology, Washington 25, D. C. Applications should be submitted not later than August 15, 1960.

Although this course is primarily designed for military personnel, a limited number of spaces have been allocated for civilian scientists. Applications will be accepted until this quota is filled.

Instinct and Sexuality in the Dog

A. BARTON, B.S., B.A., D.V.M.
Forest Hills, New York

AN ANIMAL ACTIVITY is said to be instinctive when the activity is performed perfectly from the very first time that it is done without any previous learning whatsoever. Activities which require learning to be performed cannot be said to be instinctive. Thus a beaver builds a dam by instinct; ants build their hills by instinct; homing pigeons return home by instinct, and so on. But man *learns* to drive a car, to fly a plane, to play the piano. He emphatically does not perform these activities instinctively. In addition, there are some activities that are not entirely instinctive, since some learning is required to bring them to full fruition. Sexual activity in the dog is one of these.

Sexual activity in the dog is partially instinctive and partially learned. It is instinctive to the extent that it is an unlearned, fundamental, biological impulse. It is not instinctive insofar as some learning is required to render that impulse functionally adequate. In primitive animals that are far below the evolutionary status of the dog, sexual activity is purely instinctive. Upon reaching puberty, these lower animals carry out their sexual functions to utter perfection without any learning whatsoever. The sexual impulse in these lower animals is perfectly and completely inherited. In dogs, on the other hand, the sexual impulse is only imperfectly inherited, and a certain amount of learning is required in order that these sexual activities that are necessary to the propagation of the species be adequately carried out. *This is more evident in the male than in the female.*

In its prepuberal life the female dog never exhibits any of its adult sexual patterns, but when it attains puberty it carries out its sexual functions from the very beginning with an admirable competence. The male, on the other hand, exhibits an abundance of its adult sexual patterns in its prepuberal existence. It mounts its companions in typical, male, mating fashion, indulges in pubic thrusts and convulsive pubic movements and seems to make every effort to learn to prepare itself to become a male adult. None the less, upon reaching puberty, it ordinarily carries out its sexual functions with extreme awkwardness and seems to require at least a modest amount of experience before it can become an effective partner in the sexual act.

These observations suggest that sexual activity is more of an instinctive manifestation in the female than it is in the male; that is, that learning is required in the male to support its instinctive sexual impulses, whereas it does not appear to be required in the female. This conclusion is further supported by neurological evidence. If the

cerebral cortices of adult male and female dogs are removed, the female continues to engage in its normal sexual activities while the male exhibits no sexual interest whatsoever.

Since the cerebral cortex is that portion of the brain which is concerned with higher intellectual functions, such as learning, memory, imagination and the like, the implication is that learning is essential to the sexual behavior of the male dog and not to the female. It also demonstrates that, from an evolutionary point of view, psychic interrelations with sexuality appear earlier in the male than in the female. Furthermore, since spayed females exhibit no sexual activity and castrated mature males males show no decline in sexual activity, sex would appear to be essentially a hormonal manifestation in the female and an "intellectual" activity in the male.

Female Role

If it is ever claimed that the human female is more "animal-like" than the male, this claim would have an evolutionary basis of fact. This evidence also helps to explain why male dogs commonly show greater discrimination in the choice of a sexual partner than a female at the highest point of heat, and also why males are more apt to be sexually disturbed than females by sudden changes in the immediate area where sexual activity is taking place. Also, the role of the female in sex is essentially passive. When she is in heat, she is simply ready for the acceptance of the male. The role of the male is essentially active. He must always be ready for the female who comes in heat. The male must achieve and maintain an erection. These facts, along with the cerebral comection with sex in the male, make it logical that the male requires the most favorable situation for achieving sexual completion and can be readily disturbed by unfavorable circumstances.

It is apparent, therefore, that while the sexual impulse has an instinctive basis, a certain amount of learning is required to render that impulse functionally adequate. The question may be rightfully raised as to why a higher animal should inherit an instinct less perfectly than a lower one. Since there are certain functions that are essential to life, should not a higher animal inherit the predispositions to these functions even more perfectly than a lower one? Why should the opposite be the case?

The reason for this apparent inconsistency is that it is one of the ways in which the progressive mental evolution of animal species was rendered possible. Let us examine this point in detail. Whereas lower animals inherit their instincts to utter perfection so that life's activities can be carried out without any form of learning, these instincts become increasingly less perfectly inherited the higher the animal progresses in its evolutionary development. The logic of the process is simply this: if the instincts necessary to survival were always perfectly inherited, there would be no need for further mental development. All of life's problems could be satisfactorily met on an instinctive level. Where instincts were only imperfectly inherited, the animal world was stimulated to exercise its mental capacities in order to cope with the problems of life. In this way, the less perfectly inherited were the instincts, the greater was the necessity and the possibility of further mental development. There are, of course, additional facets to the stimulation of mental evolutionary development, but the way just described was likely of considerable importance. However imperfectly these instincts were inherited, they still persisted. They were apparently necessary for the continued survival of the species. And since they were imperfectly inherited, they had to be supplemented by learning in order to bring them to full fruition. If this did not occur the species was doomed unless some drastic and favorable change in the inheritance pattern took place. Sexual behavior in the dog exemplifies rather typically how learning supplemented an imperfectly inherited sexual impulse.

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STAPHYLOCOCCUS AUREUS

Sensitivity Testing

PHILLIP H. MANN
Department of Bacteriology
Lebanon Hospital
Bronx, New York

INFECTIONS caused by *Staphylococcus aureus* are commonly encountered in a veterinary practice. Preliminary data available to us from the manufacturer[a] indicate that furaltadone (Alfafur — Eaton Laboratories), the newest member of the nitrofuran series of antimicrobial compounds, is bactericidal *in vitro* against a variety of pathogens, notably staphylococci. The present study was therefore undertaken to further evaluate this drug. With these considerations in mind we have determined the *in vitro* susceptibility of 250 coagulase positive, mannitol positive, phage-identified, animal strains of *Staph. aureus* to furaltadone.

Materials and Methods

Fifteen ovine, 17 avian, 8 equine, 8 feline, 31 canine, 2 porcine, and 169 bovine strains of *Staph. aureus* were obtained from various sources throughout the country. The bacteriological methods we employed have been previously described.[a] Approximately one-half of these strains had been recently isolated whereas the others consisted of either lyophilized or old stock cultures. Prior to testing with furaltadone, the cultures were typed using bacteriophages and classified as follows:* group I, not including 80/81, had 15 strains; group III, 34; group IV, 15; cultures lysed by phages belonging to two or more different groups, 41; type 80/81, 3; type 187, 2; type 81, 2; and non-typeable (NT), 145.

Sensitivity testing was performed using the agar plate-antibiotic disc method. This consisted of the uniform inoculation of the surface of a trypticase soy agar (BBL) plate with 2 ml. of a four-hour trypticase broth (BBL) culture for each organism tested. The excess liquid was removed by aspiration and the plates allowed to dry. Three (3) 50 microgram furaltadone discs (control no. 905043-BBL) were distributed on each plate by

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*Bacteriophage typing was accomplished by the use of an apparatus (U. S. Pat. Pending No. 773067) developed by S. Goldberg, Phage Typing Laboratory, New York City Department of Health. The different strains of staphylococci were classified into groups (International Basic Set of Phages; Additional Phages[1]) on the basis of their lysis by one or more of the bacteriophages that identify the group: group I, phages, 29, 52, 52A, 79, 80; group II, phages, 3A, 3B, 3C, 55, 71; group III, phages, 6, 7, 42E, b7, 47C, 53, 54, 73, 75, 77, VA4 (83); group IV, phage, 42D.
Type 80/81 is commonly referred to as "epidemic strain"; type 187 is unclassified; type 81 is unclassified; NT, non-typeable with the Routine Test Dilution of 10^{-3} to 10^{-5} dilution of phage, — possibility of being typeable with concentrated phage or 10^{-1} dilution of phage.
(BBL) Baltimore Biological Laboratories, Baltimore, Maryland.

means of a Sensi-Disc Dispenser (BBL). To insure contact, the discs were then gently pressed to the surface of the agar with sterile forceps. The Petri dishes were incubated overnight at 37 C. and then examined qualitatively for zones of inhibition of bacterial growth.

Results and Discussion

All strains tested were susceptible *in vitro* to 50 micrograms of furaltadone since well-defined zones, indicating the absence of bacterial growth, were observed around the sensitivity discs. The diameter of these zones appeared to be independent of the bacteriophage type of the organism. No resistance to furaltadone was demonstrated by either the recently isolated strains or by those designated as old stock cultures.

The diameter of a zone depends to an extent upon certain factors such as the solubility and/or diffusibility of the antibiotic in agar[4] and is not a quantitative reflection of the susceptibility of an organism to a given antibiotic. Results obtained using the sensitivity disc method should therefore be reported as either susceptible or resistant.

The data presented indicate that furaltadone is effective *in vitro* against coagulase-positive staphylococci. It is recognized that the *in vivo* effectiveness of antibiotics may not necessarily correspond to their *in vitro* activity. From these results, however, it would appear that further clinical trials with this drug are warranted.

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Radiographic Aids For Practitioners

The first issue of Radiographic Aids for the Veterinary Practitioner, a service of The Quaker Oats Company's Pet Food Division, has been mailed. More than 4,000 responses to the initial mailing have been received by the company.

The first series consists of four booklets of radiographs depicting normals of both the dog and cat. The first issue deals with a canine pelvis, lumbar and hind leg (mid portion).

The second issue, scheduled for mailing in late March, was comprised of radiographs of a canine hind leg (distal portion), thorax, thoracic and abdominal region (young dog), and foreleg (proximal and distal portion).

Issue number three will contain various views of a canine head, neck region and thorax. The fourth issue, last of the first series, will be devoted entirely to radiographs of the cat. All told, a total of sixteen radiographs will be utilized in the first series.

The idea for Radiographic Aids for the Veterinary Practitioner was conceived by two veterinarians: Dr. C. W. Schulz, Manager of Veterinary Services, The Quaker Oats Company, and Dr. W. C. Banks, Professor of Veterinary Radiology, Texas A & M College, College Station, Texas. Currently, the two men are developing a second series.

Report From Africa

Dr. Deets Picket, Kansas City veterinarian has just returned from another expedition into the Cameroon country. The following notes made on the spot reflect vividly the excitement associated with recent independence from French rule.

Dr. Picket's professional training has been most valuable in obtaining and supplying healthy zoo specimens.

February 3, 1960

I'm still sitting in this ringside seat observing the birth of a nation. The labor pains are somewhat nerve-wracking, even for an observer.

A week or so ago, the Bamilekes beheaded a Canadian priest and a brother and carried their heads off into the jungle. One of the Bamilekes had apparently had an education, because he came up with the idea that this sort of thing could be made commercially profitable. Two days ago the Canadian Brothers who operate a school close to Doualla received a letter from a Bamileke leader. He advised them that it would be possible to continue operating the school and retain their heads. All they would have to do is contribute sixty-eight thousand francs a week to the "movement." Regardless of the sum named, they are not to receive a single franc from the Brothers. Their peaceful hearts have been stirred to battle, so they are going to defy the Bamilekes. Our own hearts go out to them.

The people here are understandably a little nervous. Reminds me a little of our pioneering forefathers. Last night we were having dinner with a number of French people, when one of the men clumsily dropped a pistol out of his pocket. That brought up the subject of these illegal arms and how many people are carrying them. One dainty little old lady reached into her purse and pulled out an American Army Colt .45 automatic. It turned out that every person there, nine in all, had a concealed arm; except yours truly, who had a tear gas gun.

The Bamilekes have not had smooth sailing all of the way. Last week they made the mistake of invading Foumban territory. A friend of mine who watched said that the Foumban warriors sailed right into those invaders and gave them a good shellacking. He said that the battle, fought mostly with spears, made him feel that he was watching a movie of a fight taking place in the Sixteenth Century. There was a decidedly Twentieth Century factor though — one of the Bamilekes was wearing a University of Minnesota sweater!

After this imbroglio, the Foumbans did a little invading of their own, razing a number of Bamileke villages. All of the men captured were beheaded; all of the women they saved and "dashed" to a probably unappreciative Sultan. There were about a hundred and fifty of each. Just like at home after a football game, the victorious warriors carried the heads of the hundred and fifty losers on their spears. After the parade, they didn't discard them, but made a small hole in the top of each kinky nob, removed the brains and mixed them with palm wine. They then drank the tasty mixture. The ceremony is supposed to give the warriors

(continued on page 62)

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REFERENCES: 1. Mosier, J. E., and Coles, E. H.: Vet. Med. 53:649 (Dec.) 1958. 2. Belloff, G. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956. 3. Mosier, J. E.: Vet. Med. 52:445 (Sept.) 1957.

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Barbiturate Antagonism

JOSE B. ARANEZ, D.V.M., M.S.
DAMASO J. PACULDO, B.V.S., D.V.M.

Baker[2] points out the usefulness of methetharimide (Mikedimide—Parlam), a selective and prompt-acting analeptic for barbiturates. On milligram-for-milligram basis, he claims that Mikedimide can antagonize the effects of barbiturates with visible reflex return, increased respiration rate and amplitude, improved pulse and heart beat, increased blood pressure, and shortened sleeping time. He further mentions the specificity of antagonism of these drugs for one another with good or excellent results in nine out of ten cases in almost 200 cats and dogs by administering Mikedimide intravenously, intraperitoneally, intrathoracically, intramuscularly and subcutaneously.

According to Clark,[3] Mikedimide has a fairly strong circulatory and respiratory stimulating effect for dogs which will cause improvement in circulation five to ten seconds after administration and an almost immediate improvement in respiration. He also believes that the drug counteracts the action of any barbiturate grain for grain.

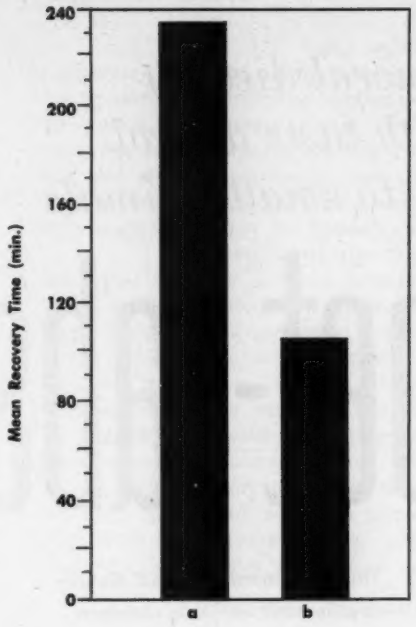
Materials and Methods

Thirty-nine mongrel dogs, 22 of which were male and 17 female, ranging from 11.0 to 28.6 lb. in weight and from six to 48 months in age were used in this experiment. Thirty-five dogs were utilized for the actual experiment and the rest, for preliminary studies. The dogs were placed in a shed, the flooring of which was cleaned and disinfected before and after the operation. Each dog was fed once daily with a mixture of boiled rice and yellow corn, together with sardines and chopped meat. Clean drinking water was made available at all times. The blood of all the dogs was examined for microfilaria, and their feces, for parasites, using the concentration and sugar flotation technics, respectively, as described by Coffin.[4] Only those dogs that were apparently healthy and free from parasites were utilized for the experiment.

The barbiturate employed was Halatal (Jensen-Salsbery) solution in 20 cc. vials. Each cubic centimeter of this solution contains 1 grain of pentobarbital sodium in a solvent of 10% alcohol, propylene glycol and water. The analeptic used was 3% Mikedimide in 60 cc. vials chemically known as 3,3-methylethyl glutaramide, and is dispensed in propylene glycol, each cubic centimeter of which contains 30 mg. (½ grain) of Mikedimide.

The study was divided into several categories using five dogs per group, *viz.*, straight Halatal anesthesia without operation; Halatal anesthesia followed 45

FIGURE 1.



The mean recovery time from straight Halatal anesthesia given intravenously compared with Halatal anesthesia given intravenously followed 45 minutes thereafter by Mikedimide given intravenously. Five unoperated dogs were used in each group.

a— Recovery time from straight Halatal anesthesia.
b— Recovery time from Halatal anesthesia followed by Mikedimide given intravenously.

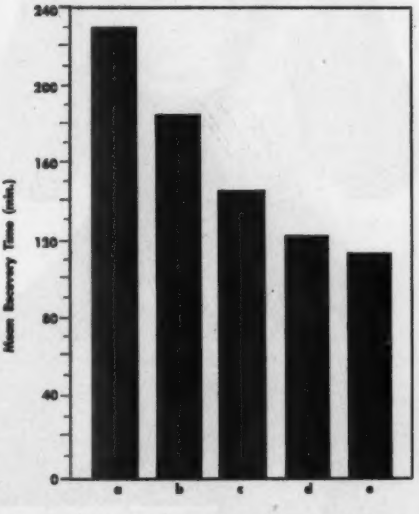
minutes thereafter by Mikedimide administered intravenously without operation; Straight Halatal anesthesia with operation; Halatal anesthesia followed 45 minutes later by Mikedimide administered through different routes with operation.

The sites for the various routes used were the following: intravenous route, left or right cephalic vein; intraperitoneal route, ½ cm. posterior to the umbilicus and 1 cm. on either side of the *linea alba;* intrathoracic route, the left sixth intercostal space 2 cm. above the costochondral junction; and intramuscular route, the gluteal muscles. The dogs operated upon under straight Halatal anesthesia and those given Mikedimide in different routes underwent one of the following operations: gastrotomy, enterotomy, splenectomy, cystotomy, and ovariectomy.

Prior to the experiment, each dog was fasted from 16 to 24 hours. Five minutes before the administration of Halatal, the pulse and respiration rates and temperature were taken and recorded. Each dog was then weighed and the approximate dose of 1 grain of pentobarbital sodium per 5 lb. body weight was computed. The animal was then properly restrained and placed on the operating table. The site of operation was shaved, cleaned and painted with 1:1000 tinted tincture of zephiran chloride, and draped. With the help of an assistant, each dog was held on the sternal recumbency and Halatal was then introduced intravenously "to effect" within three to five minutes, and it was noted that the amount of Halatal administered was almost the same as the recommended dose. The pulse and respiration rates and temperature were taken at five-minute intervals from the advent of surgical anesthesia until the first manifestation of recovery. The operation performed on each dog was completed within

(continued on page 60)

FIGURE 2.



The mean recovery time from straight Halatal anesthesia given intravenously compared with Halatal anesthesia given intravenously followed 45 minutes thereafter by Mikedimide through four routes of administration. Five operated dogs were used in each group.

a— Recovery time from straight Halatal anesthesia.
b— Recovery time from Halatal anesthesia followed by Mikedimide given intramuscularly.
c— Recovery time from Halatal anesthesia followed by Mikedimide given intraperitoneally.
d— Recovery time from Halatal anesthesia followed by Mikedimide given intrathoracically.
e— Recovery time from Halatal anesthesia followed by Mikedimide given intravenously.

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TABLE 1. Summary of the Pulse and Respiration Rates and Body Temperature, Duration of Anesthesia

		Straight Halatal Given Intravenously in 5 Unoperated Dogs		Straight Halatal Given Intravenously in 5 Operated Dogs		Halatal Given Intravenously Followed 45 Minutes Thereafter by Mikedimide Given Intravenously in 5 Unoperated Dogs	
		Range	Mean	Range	Mean	Range	Mean
Prior to Surgical Anesthesia	P	96 —120	110.40± 4.66	80 —120	96.00± 6.81	112 —120	116.00± 1.79
	R	20 — 28	25.60± 1.60	24 —32	27.20± 1.50	24 — 28	26.40± 0.98
	T (C.)	38.9 — 39.2	39.04± 0.05	38.8 — 39.0	38.92± 0.03	38.9 — 39.00	38.94± 0.02
During Surgical Anesthesia	P	118.15—133.54	126.98± 2.81	105.43—144.42	129.68± 6.71	120.89—138.22	131.73± 3.02
	R	5.92— 17.45	12.47± 1.89	8.89— 20.53	16.02± 1.94	13.33— 26.22	17.55± 2.33
	T (C.)	38.11— 38.90	38.62± 0.14	37.97— 39.02	38.56± 0.14	38.60— 39.01	38.85± 0.07
Duration of Surgical Anesthesia	(min.)	60.00—105.00	76.00± 9.14	60.00— 90.00	59.00± 5.57	—	—
During Recovery	P	128.14—147.64	137.44± 3.76	135.85—146.97	142.30± 1.84	141.50—148.40	143.76± 1.19
	R	11.09— 21.57	16.20± 1.66	19.74— 26.69	22.25± 1.17	25.00— 36.20	31.18± 1.85
	T (C.)	37.22— 38.24	37.76± 0.17	36.79— 37.99	37.46± 0.23	38.02— 38.56	38.37± 0.30
Duration of Recovery	(min.)	140 —370	238.00± 41.97	175 —275	232.00± 18.93	85 —120	106.00± 6.20

P—Pulse rate; R—Respiration rate; T—Body
Figure after ± is standard error.

(continued from page 57)

45 minutes and, thereafter, Mikedimide was administered through the various routes. Close observation of the animal for signs of recovery, which was marked by the return of the reflexes, was noted on dogs under straight Halatal anesthesia, and those given Mikedimide through different routes until the animals could almost stand. This consisted of touching the palpebral structures, the cornea, pinching the skin over the different body parts, pressing on the foot pads for palpebral, corneal, pinch and pedal reflexes, respectively.

Following the recommendation of Clark,[2] and Baker,[3] Mikedimide was administered on a grain-for-grain basis with Halatal. For every cc. of Halatal, 2 cc. of Mikedimide was administered because each cc. of Halatal solution contains 1 grain of pentobarbital sodium, whereas the same volume of Mikedimide solution contains ½ grain of the analeptic. Mikedimide was administered through various routes in five minutes per dog and route, and the pulse and respiration rates and temperature were likewise taken at five minute intervals.

Discussion

The mean recovery time, using the t-test, of dogs under straight Halatal anesthesia, and of those dogs under Halatal anesthesia followed 45 minutes thereafter by Mikedimide through various routes, revealed that the intravenous, intrathoracic, and intraperitoneal injections of Mikedimide were highly significant at the 1% level for operated dogs. The intravenous injection of the analeptic on unoperated dogs gave a significant result at the 2.5% level, but the intramuscular route was not significant at the 5% level for operated dogs. If more than one injection of Mikedimide was given intramuscularly, the recovery time might have been significant.

The intravenous route offers quick introduction of Mikedimide with instantaneous and vigorous results. This is followed by the intrathoracic route, also producing instantaneous though less vigorous results. The intraperitoneal route produces weaker results manifested five to ten minutes after the injection of the drug. The intramuscular route produces the least reactions. When the patient shows no immediate exposure to the fatal effects of the anesthetic, the intraperitoneal or intramuscular injection is advisable to obviate any anxiety on the part of the surgeon and the client regarding the life of the patient.

Halatal Given Intravenously Followed 45 Minutes Thereafter by Mikedimide Given Intravenously in 5 Operated Dogs			Halatal Given Intravenously Followed 45 Minutes Thereafter by Mikedimide Given Intraperitoneally in 5 Operated Dogs			Halatal Given Intravenously Followed 45 Minutes Thereafter by Mikedimide Given Intrathoracically in 5 Operated Dogs			Halatal Given Intravenously Followed 45 Minutes Thereafter by Mikedimide Given Intramuscularly in 5 Operated Dogs		
Range	Mean		Range	Mean		Range	Mean		Range	Mean	
96 —120	107.20±	4.08	96 —120	106.40±	4.31	88 —112	98.40±	4.31	96 —120	108.00±	4.38
20 — 32	25.60±	2.40	20 — 36	28.80±	2.65	24 — 32	28.00±	1.79	20 — 32	26.40±	2.04
38.5 — 39.0	38.78±	0.09	38.5 — 39.0	38.84±	0.09	38.6 — 39.0	38.88±	0.07	38.9 — 39.0	38.96±	0.02
90.67—136.00	118.93±	7.57	123.11—138.22	131.56±	2.47	108.00—141.33	129.87±	5.89	130.67—139.11	134.67±	1.44
12.44— 24.44	19.29±	2.20	14.67— 20.89	18.76±	1.14	17.33— 23.56	20.62±	1.09	13.78— 20.89	16.67±	1.32
38.01— 38.73	38.45±	0.12	37.96— 38.89	38.63±	0.17	38.42— 39.09	38.85±	0.12	38.72— 38.81	38.79±	0.02
—	—		—	—		—	—		—	—	
149.85—153.20	150.43±	0.72	150.62—156.13	153.62±	0.89	159.83—165.08	161.56±	0.92	139.44—142.48	140.94±	0.58
28.62— 34.50	31.74±	1.13	28.62— 40.28	36.96±	2.13	41.44— 60.64	49.05±	3.65	21.58— 26.57	24.75±	0.85
38.08— 38.52	38.33±	0.08	37.41— 38.66	38.26±	0.22	38.32— 38.86	38.57±	0.09	38.07— 38.19	38.14±	0.02
95 —130	114.00±	6.96	130 —155	144.00±	4.30	120 —130	124.00±	1.87	155 —210	184.00±	11.34

temperature; C—Degrees in Centigrade.

Note: Pulse rate in operated dogs injected intrathoracically 45 minutes after intravenous anesthesia should read 108.44-141.33, not 108-141.33.

Summary and Conclusions

The effects of Mikedimide administered intravenously, intraperitoneally, intrathoracically and intramuscularly in 25 dogs under the influence of Halatal anesthesia, and ten dogs under straight Halatal anesthesia are presented.

1. There was a notable increase of the mean pulse and respiration rates in all cases from the stage of Halatal anesthesia followed 45 minutes thereafter by Mikedimide injection through the aforementioned routes.

2. On the other hand, the temperature continued to decrease even after the administration of Mikedimide which was similar to those cases which recovered from straight Halatal anesthesia.

3. A distinct reduction of the mean recovery time from Halatal anesthesia was obtained after Mikedimide injection through the various routes.

Acknowledgments

Doctor Aranez is assistant professor and acting head of the Department of Veterinary Medicine and Surgery, College of Veterinary Medicine, University of the Philippines, Quezon City; Doctor Paculdo is a recent graduate from the same college.

This is a portion of an undergraduate thesis presented by the junior author on March 31, 1959, to the Faculty of the College of Veterinary Medicine, University of the Philippines, in partial fulfillment of the requirements for the degree of doctor of veterinary medicine. This work was conducted under the direction of the senior author.

The authors gratefully acknowledge the encouragement of Dr. L. M. Yutuc, professor and head of the Department of Veterinary Medicine and Surgery, and dean of the college, and the suggestions of Dr. A. C. Gonzaga, professor and head of the Department of Veterinary Physiology and Pharmacology from the same college.

Mikedimide (methetharimide) was supplied in 60 cc. vials, courtesy of Parlam Corporation, 266 South Dean Street, Englewood, New Jersey.

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(continued from page 54)

the strength, intelligence and courage of the vanquished.

Japosten
February 19, 1960

It was a relief to get out here in the deep green. I'm afraid that we won't have much time for all the things we want to do, but we're going to give it the ole' college try.

Last night we stayed at the coffee plantation of Monsieur Sombre. After driving for many miles on a road that only a four wheel drive vehicle could negotiate, it was almost breath taking to see the orderly plantation this man had carved right out of the heart of the jungle. There were drying platforms, washing and peeling machinery and everything else that it takes to start coffee on its way to the breakfast table. When I asked who did his servicing on the machinery, he said that he did everything himself. What a guy! And, about thirty-seven, tall, broad shouldered, handsome and a man's man, too!

M. Sombre and his charming wife entertained us with stories of the experiences they have had while developing their plantation. M. Sombre had brought his new bride to this wilderness of African jungle back in 1950. At that time, an old African chief lived right on the edge of their plantation, and he still does. They pointed him out to me this morning. He's kind of a cheerful looking old boy who still has a pretty good set of sharply filed teeth.

While getting acquainted with her new neighbors, Madame Sombre visited this little native village. The chief was cordial and apparently glad to meet her. She noticed a very fat little boy in a bamboo cage. The chief told her that the little fellow was his son, but offered no explanation as to why he was in the cage. The boy seemed happy enough, and he was certainly supplied with ample vittles. She supposed that some kind of disciplinary action had been taken by the old chief; and, as a newcomer, she wasn't going to criticize an African for the manner in which he corrected his small son. She had occasion to visit the village several times in the next month, and the lad was still in the cage, but well supplied with food.

One morning the chief's oldest wife was standing out in the middle of the road telling the whole jungle — and all else who would listen — that she had been unjustly discriminated against. Last night they had done had one big celebration, and they wouldn't give her one little bit of that fine chop. When Sombre inquired, thinking that with her creating such a fuss, they must have had something very special, he found that they had! The little fat boy! And that poor old soul didn't get even a finger to gnaw on!

He reported immediately to Yaounde. The French government officials, who, even in that distant past didn't encourage the use of chubby little boys as a main course on African tables, made an immediate investigation, but they weren't able to prove a thing, so the investigation came to nought. For some peculiar reason, the old lady disappeared before the investigation. She probably wandered off into the jungle and couldn't find her way back — don't you think?

Dangers of Stilbestrol

The Journal of Diseases of Children [95:637, 1958] reports that effective stilbestrol exposure may result from inhalation, percutaneous absorption or ingestion. In one instance breasts became enlarged in the 44 month old son and 23 month old daughter, and twice monthly menstrual periods occurred in the wife of a poultry farmer who injected paste implanted stilbestrol into chickens. The paste occasionally splattered on the farmer's clothes and the children had been playing with the stilbestrol.

The Council on Rural Health of the American Medical Association is concerned over additives in foods and the subject was on the agenda of the 15th National Rural Health Conference at Grand Rapids, Michigan, February 25-27. —*Veterinary Public Health Newsletter, December 1959.*

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Clinico-Pathological Study of Canine Dermatoses

ROBERT M. SCHWARTZMAN, V.M.D., M.P.H., Ph.D.[1]
GEORGE MATHER, D.V.M., Ph.D.[2]

This study is undertaken with the purpose of defining the gross and histologic pathology of canine dermatoses and of correlating these findings with historical information and clinical signs and symptoms. In addition, the causative factors are sought and discussed as interpreted from the accumulated data.

A review of veterinary literature reveals little and usually incomplete information on the pathology of canine dermatoses. It appears that veterinary research has concentrated its efforts, for the most part, in the fields of infectious diseases, bacteriology and virology, and other areas of economic importance to livestock. Consequently, veterinary dermatology, and especially canine dermatology has been neglected.

This is difficult to justify as canine dermatology is an important segment of veterinary medicine. At the Veterinary Clinic of the Univ. of Minnesota it represents approximately 15 percent of all cases presented. During 1954-1957, an average of 550 canine and feline dermatologic registrations were made yearly. The individual case is a major problem to all parties concerned. The veterinarian is limited in his diagnostic and therapeutic knowledge, the client is burdened with the expense of a chronic problem and the patient suffers from the disease. The constant scratching, biting and rubbing that dogs manifest to relieve pruritus is distressing to observe. In addition, the skin mirrors systemic diseases; for example Cushing's disease, hypothyroidism and nutritional deficiencies.

Clinical Problems

There are particular problems inherent to the practice of canine dermatology which should be stressed:

1. Good histories rarely are obtained. Few clients observe the original lesions and therefore, little or no information concerning the initial eruption, its pathogenesis or early course can be obtained.

A thesis submitted to the faculty of the Graduate School of the University of Minnesota in partial fulfillment of the requirements for the degree of doctor of philosophy. To be published in full as a monograph by Charles C. Thomas, Springfield, Illinois, 1960.

[1]. *Assistant Professor of Medicine, School of Veterinary Medicine, University of Pennsylvania, Philadelphia 4, Pennsylvania.*

[2]. *Professor of Medicine, College of Veterinary Medicine, University of Minnesota, St. Paul 8, Minnesota.*

2. A primary lesion, if pruritic, may be obliterated by self-inflicted trauma.

3. Careful examination is difficult and the topography of the dermatosis is often tedious, if not impossible to delineate.

4. Economics play an important part in client relationships. This is an obvious hindrance to the men in non-institutional practice, who cannot utilize laboratory procedures because of the owner's unwillingness to pay for them.

Variation in dermatologic terminology as used by veterinarians in their publications and presentations has caused confusion and misunderstanding, and has interfered greatly with the interpretation of information. It would seem imperative that we all speak the same "dermatologic language" if we wish to understand one another. Therefore, the terminology of human pathology and dermatology was selected for this study for the following reasons:

1. The language of human pathology and dermatology is universally understood.

2. Human dermatology has achieved the greater degree of advancement.

The pathologic terms, as used in this study, are defined by Lever in his text, *Histopathology of the Skin*[4]. In addition, as the normal canine epidermis has no rete pegs, the word "pegging" is used in this study to describe a type of acanthosis in which there is downward proliferation of the stratum malpighii to form rete pegs and dermal papillae. Clinical terms are used as defined by Pillsbury, Shelley and Kligman[5].

Material and Methods

The data collected for this study was obtained from 265 dermatologic cases presented to the Veterinary Clinic of the University of Minnesota, St. Paul, Minnesota. In addition 37 cutaneous tumors were submitted for histologic study from practicing veterinarians in the mid-western United States. The study extended from March, 1957 to June, 1958 and the information from each presented case was collected on the following form:

DATE .....S No. .....
Age..... Breed..... Sex.... Color..... Name.....
Past History (other than skin): Address.....
Phone.....

PRESENT HISTORY:
- Appearance
- Behavior
- Body Condt.
- Posture, gait
- Attitude
- Any other information
- MM
- Eyes
- Temp.
- Pulse
- Resp.
- Parasites (endo)

SKIN DISEASE (past, date, similarity, etc.):

SKIN DISEASE (present):
- Diet:
- Grooming:
- Environment (outdoors, indoors, etc.):
- Any similar trouble in litter mates, neighborhood:
- Duration and previous treatment:
- Complaint (present):

SKIN LESIONS:
- Description of: (papules, pastules, raw, weeping, etc.)
- Distribution of:
- Skin color:
- Skin thickness:
- Skin odor:
- Skin parasites:
- Hair:

LABORATORY WORK
- Culture of skin:
- Biopsy:
- Scraping:
- Wood's lamp:
- Picture:
- Hematology, urinalysis, etc.:

TENTATIVE DIAGNOSIS:
PROGNOSIS:
TREATMENT RECOMMENDED:

Biopsy

All lesions were biopsied with a two mm. or four mm. Keyes cutaneous punch. In ten of the 265 cases, the owners refused permission to obtain a biopsy. Initially, the biopsy procedure was performed as follows: The site to be studied was cleared of hair with a pair of scissors and cleaned with 70 percent alcohol. One-quarter to 3 ml. of 2 percent procaine was injected intradermally and five minutes was allowed for the development of anesthesia. The instrument was forced downward with a rapid rotary movement through the tissues to the level of the subcutis and withdrawn.

Hemorrhage was controlled by pressure with a ball of cotton for one or two minutes. When bleeding had ceased, the punch was lifted out of the skin and cut at its base with a pair of scissors. The wound was cauterized with a silver nitrate stick and bacitracin ointment was applied three times daily for three days.

As this procedure proved unsatisfactory, a different approach was instituted later. Hair was removed with a scissors but the lesion was not cleaned. The site was anesthetized with Frigiderm (R); the spray being applied for ten seconds or until the tissue appeared frozen. The surgical procedure was performed as described above, but the wound was not cauterized.

The wound was treated with bacitracin ointment three times daily for three days. This method proved satisfactory and was used throughout the greater part of the study. Whenever possible, biopsies of normal tissue in the immediate vicinity of the lesion, or on the contralateral side, were made for comparative studies. If the patient was difficult to restrain, promazine was injected intravenously at a dose rate of one to two mgms. per pound of body weight.

Biopsies were placed in ten percent buffered formalin and allowed to fix for a minimum of 24 hours. All sections were stained with hematoxylin and eosin[4]. In addition, all tumors were stained with toluidine blue[2]. A Gram's stain[3] was made of sections from insect bites. Sections from mycotic lesions were stained with the periodic acid Schiff reaction[4]. A mucicarmine stain[1] and periodic acid Schiff reaction were made of sections from hypothyroid patients. The histopathologic preparation of all sections was done by the Division of Dermatology, University of Minnesota hospital.

Phagocytosis

To determine the body's response to the bacteria, smears were made of all pyodermas by gently spreading the pus or exudate on a slide, allowing it to dry and staining with Wright's stain. In addition pus was cultured on blood agar at 37° C. for three days and smears were stained with Gram's stain for the identification of the organism.

Suspected mycotic dermatoses were investigated in the following manner:

1. The lesion was illuminated with ultraviolet light (Wood's lamp).

2. Hair from the border of the lesion was epilated, placed on a slide and treated with 10% potassium hydroxide for 15 minutes and then examined under the microscope.

3. The periphery of the lesion was cleaned with 70% alcohol. Hair was epilated with a sterile thumb forceps and then placed on a commercially prepared culture, Mycophil®. The petri dish was taped closed and observed for growth of fungus elements for 30 days.

Laboratory procedures (as complete blood counts, serum cholesterol determinations, liver function tests, urinalyses) were performed when indicated.

A 35 mm. Exacta camera, a Novoflex bellows extension, and a Steinheil 135 mm. lens were used for the hyper-closeup photography. The light source was a 75 watt electronic flash. All pictures were taken under standard conditions and the "subject image: life size ratios" were 0.37 and 0.82. The photomicrographs were taken with a Microstar series four unit,* according to the manufacturer's recommendation.

Follow-ups of the cases and evaluation of the treatment were carried out only when such information would help substantiate a diagnosis. For example, a case suggestive of sarcoptic mange might be classified as such in the absence of demonstrating the organism if specific anti-scabies therapy evoked a cure.

For each entity, where possible, accumulated data from the cases are presented in the form described below:

Name of the disease—number of cases
(Synonyms)
Definition:
Etio-pathogenesis:
Clinical Manifestations:
Topography:

**American Optical Co., Buffalo 15, New York*

Lesions:
Pathology:
Discussion and correlation:

Terminology

In an attempt to resolve the confusion that exists in the terminology and classification of skin diseases, the name given is based on causation and topography or description as suggested by Rattner*. For example, interdigital cyst was changed to interdigital foreign body granuloma as the latter defines the topography and cause of the lesion. The definition represents a brief but salient description of the disease.

The etio-pathogenesis is an attempt to define the mechanism by which the disease evolves, and is based on critical analysis of the data. Clinical manifestations and pathology consists of accurate reporting of the lesions, both macroscopically and miscroscopically. Major emphasis is given to the average or usual clinical and pathologic findings.

The discussion brings together the above mentioned subjects, presents additional information and attempts to correlate all the data. In doing so, a major effort is made to interpret the findings and to suggest the cause and evolution of the disease. It affords the author the opportunity to express ideas which are based, whenever possible, on observed facts. It must be emphasized that the present study cannot define and describe each entity totally. It is though, the first step in this direction and is intended to give as much insight as the data permit.

Conclusions*

All cases, other than tumors, were grouped into the following entities:

Diagnoses of 202 Cases of Canine Dermatoses

Diagnosis	No. of Cases
Interdigital Foreign Body Granuloma (Interdigital Cyst)	5
Acral Pruritic Granuloma	5
Pyoderma	23
Lip Fold Pyoderma (Lip Fold Dermatitis)	5
Insect Bites	14
Acute Pyo-traumatic Dermatitis (Hotspot)	27
Chronic Flea Bite Dermatitis (Summer Eczema)	12
Seborrheic Complex	30
Demodectic Mange	23
Seasonal Pruritus	7
Hormonal Alopecias	15
Axillary Intertrigo (Frictional Acanthosis)	5
Pressure Sores	4
Granuloma	5
Lichenification on the Lateral Folds of the Flank	3
Urticaria	2
North America Blastomycosis	1
Apocrine Miliaria	1
Keratosis Pilaris	1
Cicatrizing Alopecia	1
Dracunculosis	1
Dermatophytosis	2
Undiagnosed Dermatoses	10

The most important fact that evolves from this study is that self-inflicted trauma and/or bacterial infection are the two most important factors in the pathogenesis of canine dermatoses. The lesions of acral pruritic granuloma, acute pyo-traumatic dermatitis, chronic flea bite dermatitis, seasonal pruritus and lichenification on the lateral folds of the flank are primarily the result of the animal's licking, biting, rubbing or scratching itself.

These five diseases represent approximately 27 percent of the 202 cases of this study. Primary or secondary bacterial infections are involved in interdigital foreign body granuloma, acral pruritic granuloma, pyodermas, lip fold pyoderma, acute pyo-traumatic dermatitis, seborrheic complex, demodectic mange, pressure sores and granulomas.

Although one cannot define the pruritic factor in each entity, it should be understood that the dog, when it experiences the itch sensation, responds by any available means — rubbing, b i t i n g, scratching or licking—to remove the cause or replace the itch sensation. In addition, the traumatized skin (excoriated, ulcerated and weeping) serves as an ideal medium for secondary bacterial infection. Thus, the animal often produces the dermatitis which is presented to the veterinarian.

Because of the length of the thesis and its forthcoming publication, only an abstraction of findings and discussion are presented here.

Self-Inflicted Trauma

The response of canine skin to self-inflicted trauma appears to vary with the area involved and the type of trauma. Prolonged irritation or licking of the groin, axilla or lateral skin fold of the flank result in lichenification (axillary intertrigo and lichenification on the lateral folds of the flank). Licking of the extremities results in a fibrotic nodule or tumor (acral pruritic granuloma). Scratching, biting or rubbing of the face, dorsal and lateral trunk result in an acute, discrete, circular ulcer (acute pyotraumatic dermatitis) or in a diffuse, chronic dermatitis (chronic flea bite dermatitis). A future study should be undertaken to investigate and enlarge this concept.

Although difficult to substantiate, boredom and neurotic mechanisms appear to play significant roles in the evolution of certain canine dermatoses. For example, acral pruritic granuloma is a disease of the older, sedentary dog, who has little to do but lie around and itch. Such an animal, or any dog who is not kept occupied by normal daily activities, can be expected to perceive minimal pruritus and respond by excoriating himself. In addition, the histories of certain cases indicated that the animal's pruritus was either the result of anxiety, frustration or an effort to attract the attention of its owner.

Reaction Patterns

Another important fact evolving from this study is that the canine skin shows limited reaction patterns when examined histologically. Most lesions presented, on histologic examination, an acute, ulcerative dermatitis (acute pyotraumatic dermatitis, lip fold pyoderma) or a subacute or chronic, non-specific dermatitis (seborrheic complex, chronic flea bite dermatitis, demodectic mange and seasonal pruritus). Because of the lack of specificity of pathologic reactions, differential diagnoses would be difficult to make with the microscope. For example, on histologic examination, the lesions of acute pyo-traumatic dermatitis could not be differentiated from lip fold pyoderma; or seborrheic complex from seasonal pruritus. It is too early to reach any conclusions regarding the diagnostic value of biopsy procedures for canine dermatoses, but at this point it appears that the biopsy best serves etiologic studies rather than diagnostic.

Skin Features

It should be noted though, that the canine skin does show some interesting pathologic features:

1. The granular layer is often present beneath the parakeratotic horny layer.
2. Plasma cells often tend to aggregate around the apocrine structures.
3. Vesiculation is rare.
4. Scales and crusts are not strongly adherent and are usually lost in obtaining tissue specimens or in tissue preparation.

The following conclusions can be made regarding the entities previously discussed:

Interdigital foreign body granulomas are solitary, granulomatous reactions resulting from the presence of a foreign body in the interdigital skin. Bacterial granulomas, with similar clinical manifestations, also may occur on the interdigital web. They are usually multiple and occur in patients with pyodermic backgrounds. The lesion, histologically, presents a chronic inflammatory reaction that predominates in the lower 2/3rds of the corium. Ingrown hairs or foreign bodies of unknown origin and/or multiple abscesses are present. The epidermis is observed to be hyperkeratotic and acanthotic.

Acral pruritic granuloma is a disease of older dogs, occurring on the distal extremities (minimal or low threshold pruritic areas). Inactivity or boredom facilitate conscious perception of pruritus from these areas. The animal responds by licking and eventually transforms this physiologic (low threshold) pruritus to a pathologic one. On histologic examination, the granuloma presents a hyperkeratotic and acanthotic epidermis or ulceration of the surface. A chronic inflammatory infiltrate is present through-

out the corium with aggregations of plasma cells around apocrine structures.

Pyodermas constitute the third largest group observed in this study. Short-haired breeds are affected most often. The lesions usually are present on thin-skinned areas such as the groin, abdomen and axilla or the face. *Micrococcus spp.* and *Streptococcus spp.* are isolated most often from the lesions.

Folliculitis, the most common form of pyoderma, tends to be pruritic and frequently occurs on thin-skinned areas. Follicular papules may become pustules, which rupture forming crusts. When the latter slough, a circular, erythematous, scaling patch of alopecia (resembling the lesion of ringworm) is evident. In addition, follicular papules may resolve spontaneously, extend laterally or coalesce to form plaques or extend deeper to form furuncles or carbuncles. Sections of folliculitis show varying degrees of inflammatory infiltrate in and around the follicles.

Impetigo is a non-pruritic disease. The lesions are almost always present on the groin. Histologically, the superficial pustule shows a discrete, subcorneal aggregation of bacteria, polymorphonuclear cells and cellular debris. A parakeratotic roof overlies the pustule and beneath it is an acanthotic Malpighian layer, which may be spongiotic and infiltrated by polymorphonuclear cells.

Juvenile pyoderma is a disease of young puppies (and especially Dachshunds), involving the face and feet predominantly. Systemic infection may follow the pyoderma. Sections show the histologic features of impetigo, folliculitis or furunculosis.

Hidradenitis suppurativa is a bacterial infection of apocrine glands. It is apparently rare, though apocrine glands are distributed universally in the dog. The outstanding histopathologic feature is the marked periapocrine infiltrate of polymorphonuclear cells, plasma cells, eosinophils, histiocytes and bacteria.

Lip fold pyoderma is a secondary bacterial infection superimposed on an irritated intertrigo. It is predominantly a disease of Cocker Spaniels, occurring during the sixth to tenth years of life. Facial soft tissue relaxation, accompanying old age, may be a factor in forming the lip fold. Histologic examination of the lesion reveals that the epidermis is either absent or in the process of infiltration and destruction. A dense infiltrate composed predominantly of polymorphonuclear cells is present in the upper corium. Bacteria are abundant in the infiltrate.

Flea bite sensitivity is probably common in the general dog population. Intradermal skin tests with flea antigen revealed that 94% of 50 normal dogs had positive reactions.

Histologically, the insect bites show certain similarities. The epidermal reaction usually is not remarkable. The major pathology is in the corium and consists of vascular dilatation, edema and an inflammatory infiltrate composed predominantly of eosinophils and histiocytes. The infiltrate is usually denser in the middle corium and fades in the upper dermis where vascular dilatation and edema are prominent. In the lower corium the density of the infiltrate is variable. The subcutis is almost always normal.

Acute pyo-traumatic dermatitis, the second most common entity observed in this study, is an ulcerative dermatitis resulting from self-inflicted trauma and secondary bacterial infection. The disease predominates in long-haired breeds and occurs during the summer months. There is strong evidence that flea bite hypersensitivity is an important factor in the evolution of the disease. A hypersensitive dog responds to the flea bite with intense trauma, thereby producing the lesion. Sections of the lesion show the epidermis to be absent or in process of infiltration and destruction. In the upper corium a dense, polymorphonuclear cell infiltrate, which tears the collagen apart and often shows a periappendageal preponderance, is present. The infiltrate fades deeper in the corium.

Chronic flea bite dermatitis is a chronic dermatitis on the lumbar and sacral back, resulting from self-inflicted trauma in response to flea bites or other

pruritic factors. Flea bite hypersensitivity is an important predisposing factor. The disease occurs mainly in long-haired and older dogs. It tends to recur annually. Histologically, the lesions show parakeratosis or hyperkeratosis and acanthosis. Throughout the upper and mid corium there is a diffuse, non-specific, chronic infiltrate. In the middle corium, the infiltrate aggregates around the appendages.

The seborrheic complex, the most common entity observed in this study, is a pilosebaceous disease of unknown origin. In the dog, it may be the result of endocrine abnormalities or errors of fat metabolism. Clinical manifestations of the disease vary greatly, but scaling and loss of hair are the characteristic findings. Four forms of the complex exist: a generalized, sicca, oleosa and dermatitic. In general, the pathologic picture is of a subacute or chronic, non-specific dermatitis. Basket-weave hyperkeratosis or parakeratosis may be present. The epidermis is acanthotic, with or without pegging. Follicular plugging is prominent. Vascular dilatation and a non-specific, subacute or chronic infiltrate are present in the upper corium. Sebaceous glands are increased in size in the oleosa form of the disease. Sections of papules, plaques or dermatitic patches show infiltration of the epidermis by inflammatory cells and spongiform pustules of Kojoe.

Demodectic mange is a subacute or chronic, non-pruritic dermatosis of young dogs and is characterized by patchy alopecia and/or pyoderma. The demodectic mite is a member of the normal skin flora and produces disease when pilosebaceous changes occur which favor the proliferation of the mite. A seborrheic soil is the factor which enhances the growth of the mite. Patches of alopecia show, on histologic examination, hyperkeratosis and regular acanthosis. Hair follicles are distended and contain keratotic material and mites. They are surrounded by a fibroblastic and histiocytic infiltrate. In the upper corium, there is a non-specific inflammatory reaction. In the more chronic lesions, there are parakeratosis and greater acanthosis with pegging. An infiltrate of polymorphonuclear cells, histiocytes and fibroblasts invades and destroys the follicles. The following is the probable evolution of the lesion: Initially, there is a diffuse, non-specific infiltrate in the upper corium with no perifollicular predilection.

As a result of the multiplication of the mite, the follicle becomes involved in an inflammatory reaction and undergoes eventual destruction. This allows for the entrance of mites and bacteria into the corium, where an intense suppurative reaction develops.

Seasonal pruritus is an idiopathic, generalized, pruritic disease starting abruptly in August and terminating with the first frost. It occurs mostly in short-haired dogs. Seasonal occurrence of pruritus, the relief afforded by cortisone and the familial tendency strongly suggest an allergic origin. Attempts to demonstrate hypersensitivity to ragweed pollen failed. Sections of lesions show a subacute or chronic, non-specific dermatitis.

Hormonal alopecias are characterized primarily by bilateral and symmetrical loss of hair and the absence of pruritus. Histologically, the skin of a hypothyroid dog shows basket-weave hyperkeratosis and slight thinning of the epidermis. Follicles are dilated, one cell layer thick and contain an excess of keratin. In some sections, the mid and lower follicles are in a resting or primitive state or there may be a paucity of pilosebaceous apparati. The corium is slightly atrophic, stains pale and appears washed out. The collagen fibers are spread apart and disarranged with clear spaces in between them. Irregular basophilic bands are present in the corium. Periodic acid Schiff and mucicarmine stained sections are negative for mucin.

An entity, clinically resembling the Sertoli cell tumor syndrome, occurs in older dogs. It may be the result of a functional endocrine abnormality (climacteric?) of the adrenal glands, pituitary or gonads. An estrogen excess is probably the basic disturbance. Sections of skin show hyperkeratosis and marked atrophy of the epidermis. Upper follicles

are dilated, filled with keratotic material and do not contain hair. Occasionally, mid and lower follicles appear as islands of follicular cells, without lumina or hairs. The corium is atrophic.

The lesion of axillary intertrigo is a lichenified patch resulting from intermittent friction. Although the disease is common to Dachshunds, it may occur in any dog whose conformation results in friction between the lower, anterior chest and inner forearm. Histologic examination of infiltrated patches reveals slight or intermittent parakeratosis and a moderate to marked acanthosis with pegging. There is an increase in melanin in the strata germinativum and malpighii. Vascular dilatation and an infiltrate composed of histiocytes, fibroblasts, plasma and mast cells and polymorphonuclear cells are prominent in the upper corium.

Pressure sores, which are common to all dogs past middle age, may occur wherever skin overlying a bony prominence without the interposition of soft tissue is subjected to pressure and friction. Sections of the lesion show much variation. The stratum corneum is increased with parakeratosis irregularly present in either a basket-weave or compact hyperkeratotic horny layer. The granular layer is increased at irregular intervals. Acanthosis is slight and regular or moderate with pegging. The follicles, and especially the surface follicles, are dilated widely and filled with keratotic material. Marked vascular dilatation and a dense infiltrate composed of histiocytes, fibroblasts and occasional chromatophores are present in the upper corium. In the middle and lower corium, fibroplasia and a periappendageal infiltrate composed of plasma cells, histiocytes, mast cells, fibroblasts and polymorphonuclear cells are present.

Lichenification on the lateral folds of the flank results from chronic licking. What initiates the lesion is not known. Histologically, the lichenified patches show parakeratosis and a marked acanthosis with pegging. The granular layer is present beneath the parakeratotic horny layer. In the upper corium vascular dilatation and a perivascular or diffuse infiltrate composed of histiocytes and occasional fibroblasts, mast and plasma cells are present. The remainder of the corium is normal.

Tumors

A review of 100 canine cutaneous tumors reveals that there is no significant difference between the occurrence of tumors of epithelial and mesenchymal origin. In addition, no significant sex difference exists. The average (mean) age of the 90 cases is 7.94 years and the median age is 8.25 years.

A third important fact evolving from the present study is that large gaps in our knowledge of canine dermatology exist and that much investigative work must be undertaken. The following are areas of research that merit immediate attention:

1. Definition of the normal cutaneous flora of the dog.

2. Investigation of the affects of hormones on the pilosebaceous apparatus of the dog.

3. Definition of the shedding cycle of the dog and characterization of hair in different body areas.

4. Investigation of the reaction of canine skin to trauma with special reference to types of trauma and areas of the body.

5. Further histopathologic and etiologic studies of canine dermatoses.

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Dr. Wayne H. Riser, President

Dr. William K. Ridell Past-President

A.A.H.A. Meets in Boston

The 27th annual meeting of the American Animal Hospital Association convened in the Statler Hilton Hotel, Boston, Massachusetts on April 19 through 21. As in past years, A.A.H.A. members shared with all members of the profession one of the nation's top technical programs.

This year's programs featured highly popular pre-convention seminars covering the gastrointestinal tract, liver and pancreas, urinary system, and respiratory system.

Closed circuit TV coverage dealt with fire protection and fire equipment; practical plastic surgery; the client and his injured pet; examination of injured dogs; recognition and diagnosis, collection, storage and administration of blood and fluid therapy; immediate management of bone and joint injuries; anesthesia; decompression of sub-dural hematoma; skin, muscle and tendon injuries and nursing and ward care.

Original papers covered radiography of the abdomen; canine dermatosis; treatment of stifle conditions; pre-operative conditions; hospital sepsis; management of shock and sepsis; traumatic injuries to the central nervous system; exploratory procedures; diseases of the feline vertebral column; treatment of ringworm in cats; disorders of old cats; vitamin E studies in cats and differential diagnosis of dyspnea.

A complete meeting report will appear in the June issue.

Here each month are published ideas
suggestions and comments
picked up by VM reporters

Small Animal Clinic

Practice Tips

To Reduce Shock and give the patient a boost include a therapeutic dose of an antihistamine in a whole blood transfusion.

An Ether Cone for a parakeet made of celluloid allows you to observe the bird during anesthesia.

A Tape Dispenser in the clinic containing all widths of tape is a time saver. A sliding cutter bar delivers any length of tape conveniently.

For Flushing ears, try a small self filling syringe.

Indiana State Meeting

Animal Medical Center

The Animal Medical Center has received he endorsement of the Department of Health, Education and Welfare and financial assistance for the development of its esearch program in the center's new building which will contain both the Speyer Hospital for Animals and the Caspary Institute for Veterinary Research.

Upon recommendation of the National Advisory Council on Health Research Facilities the Surgeon General has approved the center's application for a Public Health Service grant not to exceed $200,000 entitled "Margaret M. Caspary Institute for Veterinary Research" from the fiscal year 1960 appropriation.

Construction of The Animal Medical Center started January 4 on a site located on the East River Drive between 61st and 62d Streets, New York City in the proximity of the Rockefeller Institute, Cornell Medical Center and Memorial Cancer Center.

Coating Pills

A method for coating pills suspended in air has been developed by Dale E. Wurster of the University of Wisconsin. The new process may protect vitamins against deterioration.

With the machine used for this process, coating material is injected by atomizers while pills are held in the air by a blower. Coating is dried immediately upon application by forced air. Small vitamin granules, the report said, are easily coated with a film that protects against chemical deterioration due to exposure.

Sensitivity Tests

MARGARET SCHLICHTING, B.A.
Veterinary Diagnostic
Laboratories

New York, N. Y.

ONE HUNDRED TESTS were selected at random, as in previous years, to report the most frequently occurring infections submitted to the laboratory for diagnosis.

Forty ear swabs, 30 blood cultures, and 30 fecal samples give an average picture for the annual survey.

Material was always incubated for at least 12 hours at 37 C. in tryptose phosphate broth before inoculation on sterile trypticase soy agar plates for a 24 hour incubation period. Ten antibiotic discs were used in each testing procedure, although only the most effective inhibitors are reported here. The completely clear zone around each was the measure of the culture's sensitivity to the drug.

Among the ear swab cultures, Gram-positive and Gram-negative rods were the most frequent form of bacteria grown. The most efficient drug and the number of times it was indicated as the drug of choice is noted as follows:

Chloromycetin	11
Furadantin	8
Furacin	8
Streptomycin	7
Terramycin	6

Among the 30 blood cultures, Gram-positive and Gram-negative rods also occurred most frequently, and the drugs of choice were as follows:

Chloromycetin	16
Furadantin	12
Penicillin and Streptomycin	12

The 30 specimens of fecal material again produced bacteria similar to the ear and blood samples in that Gram-positive and Gram-negative rods predominated. The most effective drugs were as follows:

Chloromycetin	12
Furacin	8
Furadantin	6
Neomycin	4

The overall efficiency of the various antibiotics can be summarized as follows:

Chloromycetin	39%
Furadantin	26%
Furacin	16%
Penicillin and Streptomycin	12%
Streptomycin	7%

Once again the efficiency of a few drugs is proved *in vitro* against common animal infections.

Urticaria In Man Traced To Penicillin In Milk

Zimmerman (American Medical Association Archives of Dermatology, 79:1, 1959) presents proof that the penicillin which is used for the treatment of bovine mastitis and which turns up in dairy products not only can but does produce allergic reactions in man. Studies of three men and one woman, all of whom had had previous allergic urticarial reactions to penicillin and in all of whom the ingestion of dairy products had produced a duplication of the earlier reaction, disclosed that an injection of 800,000 units of penicillinase—a penicillin-destroying enzyme with effect only on penicillin—rapidly cleared the reaction. The studies also disclosed that these patients were able to consume dairy products without further allergic complications provided they were given prophylactic injections of penicillinase before ingestion of dairy products.—*Veterinary Public Health Newsletter, December 1959.*

The trumpeter swan is a vegetarian, feeding largely on underwater plants.

Here's a chart on the "young and old" of wildlife that might settle current or future arguments:

	MALE	FEMALE	YOUNG
Elk	Bull	Cow	Calf
Deer	Buck	Doe	Fawn
Antelope	Buck	Doe	Fawn
Coyote	Male	Bitch	Whelp
Fox	Dog	Vixen	Kit
Geese	Gander	Goose	Gosling
Pheasant	Cock	Hen	Chick
Steelhead	Buck	Doe	Fry

A complete routine for examination and necropsy of poultry is presented. This listing of structures to be examined and conditions to look for should prove valuable to practitioners interested in improving diagnostic service to poultrymen.

CLINICAL ASPECTS OF POULTRY DIAGNOSIS

DAVID C. TUDOR, V.M.D., B.S.

Department of Poultry Science
Rutgers University, New Brunswick, N.J.

The reputation of a poultry practitioner depends largely on his diagnostic ability. To make a reliable diagnosis, the practitioner should examine several specimens of afflicted birds in both their living and dead state. Since these specimens do not always give an indication of the immediate problem, it may be necessary also to secure specimens of birds already dead from the affliction.

Living specimens should be examined for ability to stand and walk, stage of molt, presence of parasites, noticeable discharges, respiratory sounds, deformities, condition of legs and skin (including pigmentation), and other gross evidence of disease.

In killing live specimens the neck should be dislocated immediately behind the head; by this method, the structures to be examined are not disturbed by the killing procedure, since the blood collects beneath the skin of the neck.

In the routine examination and necropsy of birds, each structure may have some bearing on the diagnosis. To avoid overlooking vital evidence, it is important to follow a definite order in the examination of a specimen. The following list shows the structures to be examined and the conditions to be noted, together with the related problems or diseases, in the natural order of the diagnostic procedure.

EXTERNAL EXAMINATION

Conditions to Note	Problem or Disease
BODY	
Weight loss, sharp keel	Malnutrition; Leukosis
Swellings	External tumors and abscesses; Pox; Synovitis
Twitching, muscular spasms	Pullet disease; Heat prostration; Poisoning
Trembling noted chiefly in head and and neck	Epidemic Tremor
Paralysis	Botulism; Vitamin B_2 deficiency; Leukosis; Vitamin E deficiency; Rickets; Poisoning; Arthritis; Epidemic tremor; Newcastle disease
Pheasants — paralysis, staggering or other nervous symptoms	Equine Encephalomyelitis
HEAD	
Swollen, puffy skin about head	Ruptured air sac
Abraided, raw, bleeding or coated with dried dark caked blood	Cannibalism
Doughy swelling of head, edema	Fowl plague; High salt diet
NECK	
Paralysis—limber condition of neck	Botulism
Twisting	Newcastle disease
Retracted over back	Vitamin E or B_1 deficiency; Newcastle disease
LEGS	
Paralysis—typically with one leg forward and other extended backward	Lymphomatosis
Scales, darkened and shriveled	Dehydration; Pullet disease; Nephritis
Rough, scaly appearance	Scaly leg mites
Weak bone structure	Rickets; Osteomalacia
Broken bones	Fractures; Osteomalacia
Enlarged, thickened shanks	Osteopetrosis
Legs spread apart—turkeys	Spraddle leg paralysis
Paralysis with hemorrhage and discoloration at hock	Rupture of tendon
Joint swelling	Staphylococcus infection; Synovitis; Arthritis
Tendon at hock displaced	Perosis; Manganese and/or Choline deficiency; Niacin and tryptophan deficiency; Biotin or folic acid deficiency
Bowed legs	Niacin deficiency in goslings and ducks
FEET	
Swollen foot pad with pus accumulation	Bumble foot
Swollen, dark, thickened, inflammed toes and feet	Carbolineum burn
Toes curled inward	Riboflavin deficiency
Toes picked	Cannibalism
Cracked feet	Pantothenic acid deficiency in chicks
FEATHERS	
Loss of feathers, neck, body or wing (primary and secondary)	Molting
Loss of barbules on feathers	Lice
Moving black or red dots	Red mites or Feather mites
Black or white deposits at base of feather shaft	Lice or Mite eggs
Soiling of hackle feathers	Sinusitis; Coryza; Cholera
Soiling of vent feathers	Diarrhea; Incontinence
Powdery material within feather shaft	Quill mites
Rough feathering	Pantothenic acid deficiency
Rough and curved feathers	Arginine deficiency in chicks

EXTERNAL EXAMINATION

Conditions to Note	Problem or Disease
SKIN	
Inflammation and evident irritation—scaly	Dermatitis; Niacin deficiency
Feather follicle bleeding	Lymphomatosis
Pliability lost	Dehydration
Pigmentation extensive	Poor production or high yellow color content in feed
Pale yellowish face, anemic	Anemia or Leukemia
Nodules about vent	Flukes
Wart-like nodules on face or exposed skin	Pox
Wing nodules	Pox vaccination takes; Paratyphoid—Pigeons
FACE	
Swollen, pus distended, sinus	Cholera; Sinusitis; Coryza; Bacterial infection
Darkness or cyanosis with scabbiness	Cannibalism
White, scaly appearance	Favus
COMB	
Mottled red and white margin	Frozen comb
Dry, scaly, shrunken	Molting; Nonproduction
Very large and pulpy on a hen	Hermaphrodite, or may be normal
Dark, cyanotic	Systemic disease; Pullet disease
Blisters, size of pin head	Fowl plague
WATTLES	
Swollen, bulbous appearance	Abscess or Cholera
Flat edematous swelling	Coryza
NOSTRILS	
Mucus or watery discharge, with or without odor	Sinusitis; Cholera; Coryza; Chronic respiratory disease; Newcastle; Bronchitis
EARS	
Pus and pasty exudate in ear canal	Cholera; Ear abscess; Pseudomonas infection
EYES	
Watery inflammation and reddening mucous membrane of eye	Ammonia conjunctivitis
Crusts on eyelid margins	Pantothenic acid deficiency
Swelling and closure	Cholera; Pox
Whitish, curdy exudate under eyelid irregular gray iris	Vitamin A deficiency; Lymphomatosis
Loss of vision	Ammonia burns; Cataracts; Lymphomatosis
MOUTH	
Swelling with firm dried exudate in corner of mouth	Abscess
Granular crusts in corners of mouth	Pantothenic acid deficiency
Yellowish adherent raised patches	Pox
Yellow caseous patches on tongue and membranes of mouth	Trichomoniasis—Pigeons
BEAK	
Both mandibles too short or lower mandible protruding too far	Faulty debeaking
Cross beak	Malformation
Cyanotic dark blue color	Carbon monoxide poisoning

INTERNAL EXAMINATON

Conditions to Note	Problem or Disease
SUBCUTANEOUS TISSUE	
Deep yellow color, gelatinous appearance	Cholesteroma
Pin head sized calcified nodules	Subcutaneous mites
Clear fluid distending tissue	Edema; Staphylococcus infection
Air accumulation between skin and breast	Ruptured air sac
BREAST MUSCLE	
Congested	Bacterial infection; Dehydration
Bite wounds	Predator
Hemorrhages	Hemorrhagic disease; Bruise
Whitish elongated, cylindrical masses imbedded in muscle tissue	Sarcocystis—Ducks
Shrinkage of breast muscle of one side	Atrophy
Blanched	Suffocation; Pullet disease; X disease
RIBS	
Beading or nodular enlargements along rib junctures	Rickets
Weakness	Osteomalacia
KEEL	
Enlarged mass on base of keel with turbid fluid within	Sternal abscess; Synovitis
Curved breast bone	Deformity
ABDOMEN	
Eggs in abdominal cavity	Internal layer
Inspissated yolk	Coliform infection; Trauma; Cholera
Excessive fat about the organs	Obesity
Liquid yolk—flaccid ova	Newcastle
Blood (liquid or clotted)	Internal hemorrhage; Hepatitis
Straw colored fluid	Ascites; Carbolineum poisoning; Crotolaria poisoning
Adhesions and semi-coagulated exudate and fluid	Peritonitis; Omphalitis—Chicks
AIR SACS	
Cloudy with yellowish exudate	Newcastle; Chronic respiratory disease
Yellowish or greenish, flattened circular lesions	Aspergillosis
Cloudy air sacs	Air sac mites; Psittacosis—Turkeys
Frothy exudate	Bronchitis; Chronic respiratory disease; Quail bronchitis
LIVER	
Whitish, fibrosis with distortion of contour	Cirrhosis, Virus hepatitis
Fibrin on surface	Chronic respiratory disease; Psittacosis
Necrosis with mottling	Hepatitis
Rupture of capsule	Injury or Hemorrhage
Multiple focal necrotic spots	X disease
Swelling with generalized dead tissue and congestion	Bacterial infection; Cholera; Omphalitis; Pullorum; Typhoid; Swine erysipelas
Numerous yellowish white firm nodules easily pealed out	Tuberculosis
Irregular round depressed ulcers or marginal yellowish clay colored necrotic areas	Blackhead
Enlarged uniformly infiltrated or nodular areas of creamy color	Lymphomatosis
Dark, congested swollen	Swine erysipelas—Turkeys
Greenish color	Biliary stasis
Yellowish, enlarged	Normal fat storage

INTERNAL EXAMINATON

Conditions to Note	Problem or Disease
SPLEEN	
Pale, small	Pullet disease (blue comb)
Swelling	Leukemia; Bacterial infection
Firm, hard, dried, dead tissue	Necrosis
Reddish, mottled, swollen	Blackhead
Firm nodules may have gritty center	Tuberculosis
Acutely enlarged, blackberry colored, soft, friable	Swine erysipelas—Turkeys
PERICARDIAL SAC	
Thickened opaque, yellowish, covered with fibrin	Chronic respiratory disease; Pericarditis; Psittacosis
Whitish crystalline deposits	Gout
Clear or straw-colored fluid within	Carbolineum poisoning; Crotolaria poisoning
HEART	
Muscular thickening and enlargement	Hypertrophy
Short, rounded, small in size	Round heart disease
Smooth, creamy nodules in muscular wall	Pullorum
Irregular nodular enlargements	Tumors; Lymphomatosis
Hemorrhages	Hemorrhagic disease; Sulfa poisoning; Cholera
KIDNEY	
Swollen, urate crystal accumulation under capsule	Pullet disease; Nephritis; Vitamin A deficiency; Gout; Dehydration
Fluid filled, swollen turbid or clear distended sacs	Cystic nephritis
Small, undeveloped	Malformation
Irregular nodular enlargements or growths	Tumors; Lymphomatosis
PROVENTRICULUS	
Swollen and inflammed, hemorrhages on papillae of wall	Proventriculitis
GIZZARD	
Coiled parasite in wall with abscess formation	Gizzard worm
Erosion of cuticular lining	Ventriculitis or Gizzard erosion
Foreign substance in lumen including nails, wire, string, etc.	Pica
INTESTINE	
Moderately thickened mucosal wall with or without visible inflammation	Trichomonads; Hexamita; Tapeworms
Elongated round parasites	Round worms
Thickened wall, heavy mucus	Capillaria
Impacted or blockage with fiber or sand	Constipation; Obstruction
Blotch hemorrhages on outer surface	Hemorrhagic disease
Watery, hemorrhagic, catarrhal, or necrotic contents of intestine with or without thickening	Enteritis or Intestinal coccidiosis
Small, circular depressed eroded areas	Ulcers; Quail disease
Twisting of intestine	Torsion
Telescoped intestine	Introsusception
Blanched chalky white, flaccid, with enteritis	Suffocation

INTERNAL EXAMINATON

Conditions to Note	Problem or Disease
CECA	
Perforation of cecal wall	Peritonitis; Blackhead
Distension with fluid blood or dried dark cecal plugs	Cecal coccidiosis
Fluid blood in ceca—no oocysts	Hemorrhagic disease
Ulceration with or without caseous dried exudate	Blackhead
Firm yellow cecal plugs in chicks	Pullorum; Paratyphoid
Short moving cylindrical parasites	Cecal worms
MESENTERY	
Nodular growths	Tumors
OVARY	
Clear fluid-filled ova	Cystic ovary
Firm, creamy infiltration of tissue	Lymphomatosis
Some ova filled with turbid fluid others solidified, discolored	Cholera; Pullorum
Turgid unaffected congested ova	Laryngotracheitis
Flaccid, shrunken, hemorrhagic	Newcastle
Flaccid, shrunken	Atrophy; Molting
OVIDUCT	
Protrusion of oviduct from exterior of body	Prolapsis
Massive accumulation of exudate within lumen	Impaction
Inflammation of oviduct wall	Salpingitis
Nodular, firm enlargement in ligament of oviduct	Tumor
BURSA FABRICUS	
Acute swelling with yellowish caseous core	Abscess
PANCREAS	
Friable and chalky color	Pullet disease
Nodular growths throughout substance	Tumors
GALL BLADDER	
Acutely distended and filled with bile	Bile duct obstruction
LUNGS	
Solidification of lung substance	Pneumonia; Aspergillosis
Nodules inflammation	Pullorum—Chicks
BRONCHI	
Pus and mucus plugs	Bronchitis
TRACHEA	
Adherent dark, small cylindrical parasites	Gapeworms
Blood, loose fibrinous caseous exudate, friable trachea	Laryngotracheitis
Heavy turbid mucus with or without blood	Newcastle
Tracheal mucus	Chronic respiratory disease; Bronchitis
LARYNX	
Loose dried, cheesy yellowish plug in entrance to larynx	Laryngotracheitis
Firm adherent yellowish plug in entrance to larynx	Pox

INTERNAL EXAMINATON

Conditions to Note	Problem or Disease
OESOPHAGUS	
Small whitish raised nodules on surface of membrane	Vitamin A deficiency
CROP	
Pendulous and distended with dried feed or fiber	Impaction; Hereditary factors
Sour fermented contents	Pox vaccination shock; Pullet disease
Lining membrane covered with whitish curdy film	Mycosis
NAVEL	
Inflammed, visibly infected, red	Omphalitis
NERVES	
Coeliac, sciatic, brachial or vagus—swollen, yellowish, loss of striations	Lymphomatosis

Paper of the Journal Series, New Jersey Agricultural Experiment Station, Rutgers University, the State University of New Jersey, Department of Poultry Science, New Brunswick.

American Foundation For Animal Health Program

Most veterinarians will recall the "feature" articles on livestock disease problems and veterinary medical service, which were used so widely in farm magazines across the country last year as part of the effort sponsored by Associated Veterinary Laboratories.

These articles are being continued through 1960, according to plans which have been announced.

One major livestock disease topic will be examined in each month's farm magazine feature, and the role of the veterinarian in dealing with the problem will be emphasized. The copy will be released through American Foundation for Animal Health, as was the case last year.

In addition, the campaign of public education will include releases throughout the year to daily and weekly newspapers, farm editors of radio stations, and a series of television programs, released nationally.

The project is designed to focus attention on livestock diseases and stress the importance of calling in a veterinarian to deal with these problems.

Dr. Steele Honored

Dr. James H. Steele, chief veterinarian of the U. S. Public Health Service's Communicable Disease Center, Atlanta, Georgia, was honored by Michigan State University recently as a prominent alumnus of the College of Veterinary Medicine. The scroll was presented at a dinner on January 20, commemorating the 50th anniversary of the founding of the College of Veterinary Medicine.

Dr. Steele was one of six veterinarians honored on this occasion.

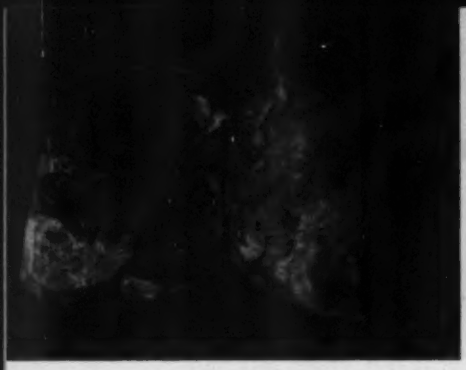


Fig. 1. An oval and elongated tumor involving right lobe of liver, having nodular projections.

Fig. 2. Left lobe of liver exhibiting foci of outgrowth marked AA.

MALIGNANT HEPATOMA IN A DUCK

DR. P. C. NAG, DR. MED. VET.,
B. S. RAJYA, M.V.Sc.,
N. C. JAIN, B.V.Sc. & A.H.

Diseases and Pests Section,
Livestock Research Station,
U.P. College of Veterinary Science
and Animal Husbandry, Mathura, India

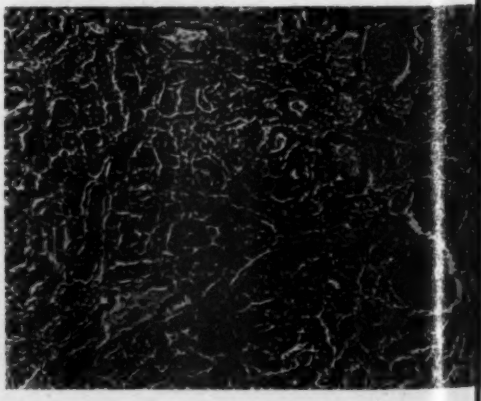
EBER and Malke[4] reported the result of the necropsy of 692 ducks, along with other birds and found only one case of adenocarcinoma of the liver. Most carcinomas in fowl involve the ovary. Those affecting the oviduct and liver are next most frequently observed. Campbell,[3] after studying 77 cases of carcinoma, found only one carcinoma of the liver.

The description of the neoplasm reported here is from the carcass of a duck received from the state farm of Bharari. The postmortem examination revealed a growth on the right lobe of liver involving almost all of the lobe and covering the major portion of the abdomen.

Gross Appearance. The tumor was oval and elongated, having nodular projections on the surface (figure 1). It measured 7.6 x 4.8 cm. and weighed 8 oz. Histopathological section revealed it to be of soft consistency, exhibiting hemorrhagic areas with necrotic foci. The tumor had a dark color, but pale areas were evident. The other lobe, which was also involved, exhibited foci of outgrowths (figure 2) resembling the main tumor on the right lobe. This was confirmed by histopathological examination.

Histopathological Structures. The parenchyma exhibited pseudolobulation by mature collagen fibers. These newly formed lobules were filled with anastomotic cords of cuboidal to polyhedral cells. Nuclei were hyperchromatic and accompanied by distinctly acidophilic granular cytoplasm. Most of these cells were enclosing a lumen and gave the appearance of the formation of tubules (figure 3). The infiltrating columns of the malignant cells were separated by two delicate stroma. In certain areas, columns of the malignant cells exhibited distinct adenoma-like structures, the

Fig. 3. Section showing tubular arrangement of hepatic cords with hyperchromatic nuclei. H.E. stain, X 180.



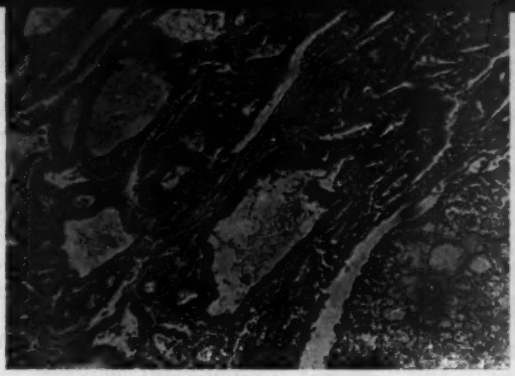


Fig. 4. Columns of malignant cells exhibiting distinct adenoma-like structures.

Fig. 5. Section showing diminished reticulum. Reticulin fiber stain, X 110.

spaces of which were lined by a single row of cells polyhedral to cuboidal in shape (figure 4). Malignant tissue revealed extensive fatty changes. Malignant cells encountered in the tumor were well differentiated and evidenced close resemblance to the embryonic liver tissue. Mitotic figures were distinct.

The uninvolved portion of the liver exhibited degenerative alterations varying from fatty changes and atrophy to necrosis of lobules. The reticulin was diminished as seen by recticulin fiber stain (figure 5).

Cells lining these alveolar type structures were in close proximity to cells described above. It can be assumed, therefore, that the anastamosing cords of the malignant cell enclosing lumen had greatly widened, giving a false impression of adenocarcinoma. Accordingly, it may be regarded as malignant hepatoma.

Discussions

The histopathological changes in the liver, as a result of neoplastic growth, confirm the observations of Campbell[3] in a primary carcinoma of liver (hepatoma) studied in a Rhode Island Red hen. The features of interest in the present observations were the occurrence of adenoma-like structures in some areas of neoplastic growth, along with the anastamosing cords of cubodial to polyhedral cells with lumen and hyperchromatic nucleus in the same slide. This adenoma-like structure did not exhibit any resemblance to bile duct carcinoma (cholangiocellular carcinoma) because the duct-like portions were neither separated by fibrous tissue, stroma, nor did they resemble the bile duct epithelium.

Summary

A case of neoplastic growth on the liver in a duck has been investigated and was considered to be malignant hepatoma.

Acknowledgment

The authors are grateful to Sri C. V. G. Choudary, Principal, U. P. College of Veterinary Science and Animal Husbandry, Mathura, for providing facilities and encouragement. Thanks are also due to Dr. C. M. Singh, Professor of Pathology and Bacteriology for confirmation of histopathological studies.

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(continued from page 37)

tion seems to set up an increased excitability extending to viciousness or savagery.

Signs of the Condition. Some sows may begin eating their young, even before farrowing is complete. The condition often appears after the completion of farrowing. The sow is restless and may even stand during farrowing. The entire litter may be destroyed, or only a few pigs may be killed at different intervals. Some are vicious to pigs and human beings, and some vicious only toward the pigs. The condition often occurs in sows that are normally gentle. Spontaneous recoveries often occur following nursing.

Treatment. The pigs should be removed, or else the sows should be crated or otherwise restrained and the pigs allowed to nurse every few hours. Injections of posterior pituitary extract, oxytocic principles, anterior pituitary extract, and tranquilizers have been used with varying degrees of success. The tranquilizers would seem to have a definite indication in this condition.

Prevention. There seems to be less cannibalism among sows that are allowed to make their own nest. If sows are noted to be nervous before farrowing, they can be tranquilized early in the farrowing period.

Mastitis

Cause. There are many bacterial causes of mastitis in the sow. They include: coliform organisms; Streptococci; Staphylococci; *Spherophorus necrophorous; Actinobacillus ligneseri; Actinomyces bovis; Corynebacterium pyogenes;* and *Mycobacterium tuberculosis.*

Predisposing Causes. Poor sanitation, wounds and contusions and metritis are predisposing conditions. The nursing habits of the pigs usually cause the wounds and contusions.

Signs of the disease. Signs vary with the causative organism. Most commonly there is a rise in temperature. Other signs noted are: hot, swollen and painful udder; ropy or clotted milk; loss of appetite; depression; reluctance to move; and a stiff gait when forced to move. The sow may refuse to allow pigs to nurse due to the pain in the udder.

In some cases, mastitis may be confined to one or more sections of the udder, or even to individual teats. These sections or individual teats may undergo atrophy and induration. On subsequent farrowings, these teats fail to secrete. Pigs nursing these sections lose condition rapidly. Competition develops among pigs for the normal sections of the udder. This type of mastitis is usually confined to older sows, and there are few, if any, systemic signs manifest by these sows.

Staphylococci or actinomycotic organisms may invade the udder and cause the formation of tumor-like masses.

Invasion of the udder by coliform organisms may cause a gangrenous type mastitis. Signs of coliform mastitis include: a high temperature; toxemia; and a purplish discoloration of the skin around the teats. The mortality is high in this type of mastitis.

The effects on baby pigs nursing mastitic sows also vary with the type of mastitis. There is evidence of malnutrition, squealing, and competition for the more normal teats. Death may be caused by starvation, or the pigs may develop a septicemia from drinking the infected milk.

Treatment. The baby pigs should be removed from the sow. They should be placed on a foster mother or hand fed. Hypoglycemia develops rapidly in starving pigs, so they should be given injections of 5% saline-dextrose solutions. If normal lactation can be restored in the affected sow, the pigs may be returned to her.

Symptomatic treatment is indicated for the sow. The constipation should be corrected by administration orally of saline cathartics or the use of some other laxative of choice. Intravenous or intramuscular injections of the antibiotic of choice are beneficial. Sulfa drugs are also effective in many cases of mastitis. In coliform mastitis, treatment is often disappointing, but early treatment with dihydrostreptomycin, repeated at frequent intervals is sometimes effective.

Posterior pituitary extract is helpful in some cases. Alternate hot and cold applications and the injection of erysipelas serum has been used with some success. Surgery may be necessary in those cases due to actinomycotic organisms. Those cases determined to be due to *Mycobacterium tuberculosis* should be sent to slaughter, and the baby pigs destroyed.

Prevention. Attention to sanitation and good management practices are always good preventive measures. Sows that lose teats or sections of the udder due to mastitis should not be used for future farrowings.

Metritis

Cause. Several organisms including *E. coli,* Streptococcus spp., and Staphylococcus spp., are associated with metritis in the sow.

Predisposing Causes. It has been demonstrated that service with a boar infected with Staphylococci can produce metritis. Other predisposing causes include uterine atony associated with farrowing, retention of fetuses or fetal membranes, improper sanitary procedures in dystocia cases and similar causes.

Signs of the disease. Signs usually appear one to three days following farrowing. There is a loss of appetite, depression, agalactia, and if the sow is forced to rise, she does so with difficulty and moves in a depressed manner. Varying degrees of constipation are noted, and the mammary glands may be swollen. A rise in temperature occurs.

Two types of discharge from the vulva may be seen. The discharge may be copious and yellowish white, or watery and serosanguineous with a foul odor. Some sows continue to suckle their pigs. These pigs may do well for one to three weeks. However, agalactia occurs in many cases of metritis and the pigs may starve, unless removed from the sow. The mortality in untreated cases of metritis can be high.

The changes noted on necropsy depend on the causative organism. Generally the uterine horns are flaccid, non-involuted, discolored, and contain varying amounts of exudate.

Treatment. Intrauterine infusions of antibiotics in conjunction with hypodermic injections of corticosteroids and penicillin or other antibiotics are recommended. Hormonal injections such as posterior pituitary extract or diethylstilbesterol often are beneficial. Correct the constipation with laxatives such as mineral oil or aloes.

Prevention. Attention to sanitary measures, avoiding use of unskilled lay assistance, and testing to eliminate those infectious diseases such as Brucellosis all have their place in a preventive program.

Milk Fever

Cause. There is a paucity of information in American veterinary literature regarding the disease condition known as milk fever or eclampsia or postparturient disease. A condition very similar to milk fever in cows apparently occurs in sows, and it responds to treatment with calcium gluconate.

Signs of the Condition. The first signs noted may occur within a few hours after farrowing. The sow goes off feed, becomes restless and milk secretion fails. Evidence of nervousness is not seen in every case. There may be a peculiar picking up of the hind legs, as though the sow is marking time. A slight incoordination develops, characterized by a staggering gait, and this incoordination progresses to apparent paralysis. The sow goes down and is unable to rise. Unless treated, she becomes comatose. The mortality is high in untreated cases.

Treatment. Give the sow 100 cc. to 150 cc. of calcium gluconate intravenously. An additional injection of 25 cc. to 50 cc. of 50% dextrose may also be given at this time. If the medication is given intraperitoneally, the dextrose should be diluted to 10%. If agalactia persists in these sows, administer posterior pituitary extract.

Osteomalacia
Paraplegia — Adult Rickets

Cause. This disease is caused by an imbalance of calcium and phosphorus. The intake of calcium may not be sufficient to meet the requirements of skeletal structures and milk secretion. This

results in a decalcification of the bones.

Predisposing Causes. The disease is predisposed by poor rations and lactation.

Signs of the condition. During middle or late lactation sows exhibit various forms of lameness, stiffness, and eventually paralysis. There is no rise in temperature and the animal is bright and alert. Often, there is a spontaneous fracture of the pelvic bones, femur, or lumbosacral vertebrae. The mortality varies, depending on the husbandry, severity of the deficiency, and the time at which treatment is instituted. There is usually no death from the deficiency itself.

In advanced cases there are fractures of the pelvic bones, or femur, or lumbosacral vertebrae evident at necropsy.

Treatment. If the case is not too far advanced, give calcium carbonate in the ration at the rate of 2 lb. per 100 lb. of feed, and 1 tablespoonful of good grade cod liver oil daily to effect.

Prevention. An adequate ration constitutes the best preventive measure.

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Dwarf Bloat Study

A very interesting report by Fletcher and Hafez of the Washington Agricultural Experiment Station is titled Fermentation Activity and Microbiology of the Bloated Dwarf Rumen. Dwarf beef cattle were used extensively in this project because chronic bloat is an inherited characteristic possibly because of unusual anatomical distortion. At any rate chronic bloat is more common, and more readily produced in dwarfs than in normal cattle. In the digestion process in dwarfs and in normal cattle, protozoa in a large measure control the bacterial numbers by feeding on them. Results of the project indicate that in dwarfs protozoa were in some cases entirely absent or at best were present in greatly reduced numbers with sluggish activity. Thus in dwarfs the bacterial activity is greater with an increase in acid production and greater gaseous pressure. The researchers found that in non-bloater dwarfs and in the normal controls protozoa were active and plentiful. The authors present no definite conclusions but it is expressed by this writer that the protozoan and bacterial disparity in bloaters is another fruitful step in determining the etiology of bloat —which is said to cause ruminant owners an annual loss of millions of dollars. —*R R. Dykstra, D.V.M.*

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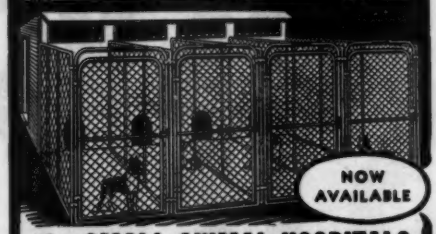

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Mr. Wayne L. Davis

Wayne L. Davis has been appointed field sales manager of the Veterinary Department, Armour Pharmaceutical Company, Robert A. Hardt, president, announced.

Mr. Davis received his B. S. degree in Animal Husbandry from Purdue University in 1948 and began work as a veterinary sales representative for American Cyanamid. For the last several years he has been a district manager for Cyanamid, most recently at Milwaukee, Wis.

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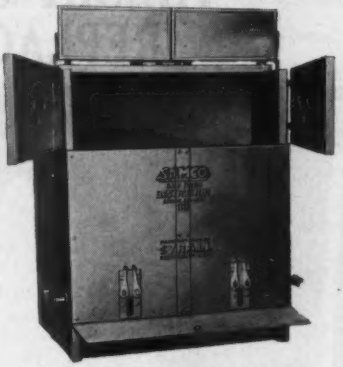

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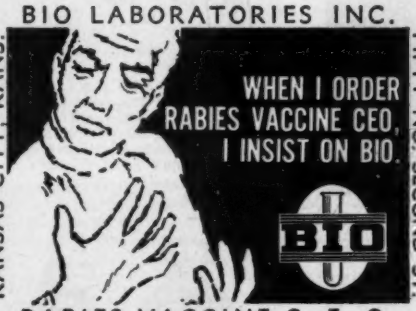

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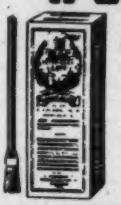

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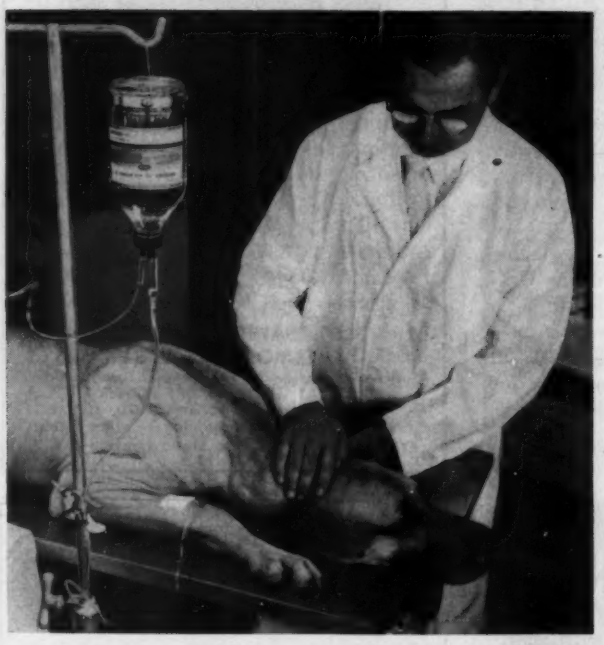

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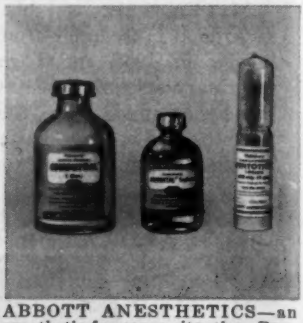

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(continued from page 88)

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This department will announce each issue new therapeutic items, equipment, services, and literature of interest to veterinarians. All claims made are those of the firms concerned. Send communications to the address noted.

Reader's Service

New, low-cost **portable oxygen unit** in a compact case suitable for offices or automobiles, is now manufactured by the Medical Division of The Burdett Oxygen Co. The unit contains 360 liters of oxygen, enough for approximately 40 minutes' use. It weighs only 22 lbs. The

unit is an accurate, scientifically developed piece of precise equipment simplified to the extent that anyone can operate it. Emergency oxygen can be administered almost instantaneously simply by opening the cylinder valve, turning the flow adjustment knob, and placing the mask on the patient's face. Oxygen cylinder contained in the kit is of a standard type and is easily refilled. Practically every area has a local oxygen supplier. Complete unit, including apparatus, filled oxygen cylinder, and convenient luggage-type case, 21½" x 12½" x 5", sells for only $79.50. For further information, write to the Medical Division of The Burdett Oxygen Co., 3300 Lakeside Ave., Cleveland 14, Ohio.

A capsule for the **relief of diarrhea** and other intestinal upsets that follow treatment with oral antibiotics has been developed by U. S. Vitamin & Pharmaceutical Corp. The capsules, known as Bacid, contain a high concentration of viable Lactobacillus acidophilus capable of being implanted in the intestinal tract. Bacid is indicated for the treatment of stubborn diarrhea following use of antibiotics, other diarrhea caused by food upsets and allergies, and for relief of certain other intestinal disorders, such as simple colitis, and functional constipation. Administering Lactobacillus acidophilus restores the natural balance of bacteria in the intestinal tract.

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snare has excellent flexibility and has proved its reliability in a big swine practice. Write Dermody & Dermody, Breda, Iowa, for details.

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the ice problem in cold climates. A closed circuit TV unit lets the operator watch his cows before they enter the milking parlor. For your free copy of the new booklet, "Surge Picture Window Parlor," write Dept. VM, Babson Bros. Dairy Research Service, 2843 W. 19th Street, Chicago 23, Illinois.

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(Reader's Service Continued)

A new, white, **Disposable Plastic Apron** is offered by Busse Plastics Co. Waist and neck ties are attached to this lightweight, opaque apron with linen-like embossing that retards flow of droppings. The Impervite vinyl resists water and chemicals. At 20¢ each the price is

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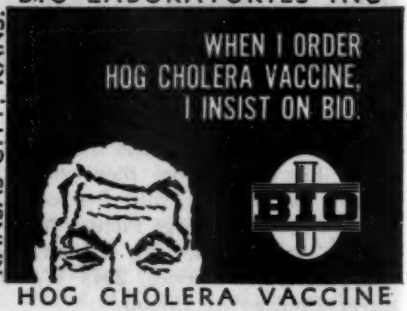

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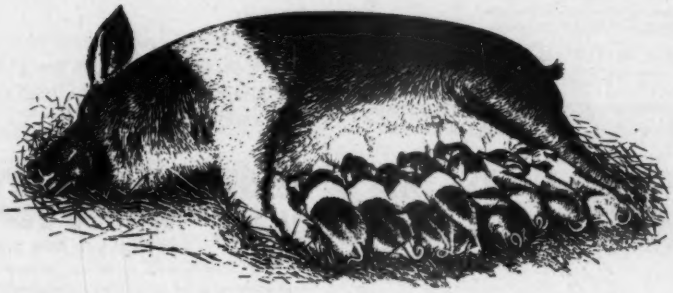

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Viruses and Immunity

Some informative points about viruses and immunity are mentioned by Mitchell of the medical faculty of the University of Ottawa in the *Canadian Journal of Comparative Medicine*, June 1959. In the article it is brought out (1) that in infectious anemia of horses, and psittacosis of birds, the "virus persists but immunity disappears"; (2) in rinderpest of cattle, hog cholera of swine, distemper of dogs, and Newcastle disease of poultry the "virus disappears but immunity persists"; (3) in foot-and-mouth disease of cattle, coital exanthema of horses, Rift Valley fever of sheep, and swine influenza, "neither virus nor immunity persist." The entire presentation by Mitchell is worth the study by those interested in the virus field.

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Guthrie to F.D.A.

The Bureau of Medicine, Food and Drug Administration announced the appointment of J. E. Guthrie, D.V.M., as a Veterinary Medical Officer in the Veterinary Medical Branch.

Dr. Guthrie was formerly Associate Director of Research for the Hess and Clark Division of the Vick Chemical Company, Ashland, Ohio.

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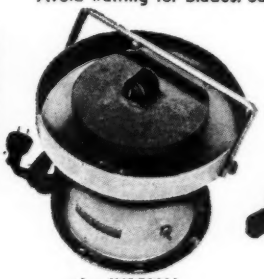

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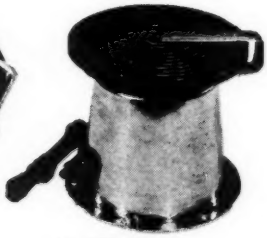

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Hidden Killers Cost Farmers $20,000,000!

Hidden killers which live on for years in the soils of pastures and barnyards, are now costing farmers over $20,000,000 a year in livestock losses.

That report, issued by American Foundation for Animal Health, cautioned animal owners that these disease organisms o no "clostridial" group . cause their greatest losses during sum ner months just ahead.

These killer organisms are th use of such livestock disease lockjaw, blackleg, malignan

Hidden Killers In Soil Cause Livestock Losses

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That report, issued by the American Foundation for Animal Health, cautioned animal owners that these disease organisms of the "clostridial" group cause their greatest losses during summer months just ahead.

These killer organisms are the cause of such livestock diseases as lockjaw, blackleg, malignant edema and enterotoxemia. The organisms generally enter the animals while grazing or through wounds.

Worry About New Wave of Hog Cholera

Authorities are seriously concerned this spring with the possibility of a new wave of hog cholera sweeping the nation's farms.

The American Foundation for Animal Health says farmers in certain areas let down their guard by permitting pigs to go unvaccinated against the disease.

Alert Farmers To Hog Disease

This year, farmers need to be more alert than ever against losses caused by swine erysipelas, according to a report issued today by the American Foundation for Animal Health.

This disease has now become the No. 1 swine problem in some states, the report says. Nationally, it ranks second only to hog cholera, and causes farm losses of over $25,000,000 per year. The problem has grown to such an extent that it has been singled out as this month's prime target for National Livestock Loss Prevention Year.

Farmers were cautioned to watch for such symptoms as constipation, weakness, loss of appetite, a stiff gait, or a tendency to remain in quarters. A prompt diagnosis is important if an outbreak is to be controlled.

In areas where erysipelas has become a problem, authorities recommend a herd vaccination program. The selection of the vaccine should be left to a veterinarian.

Baby Pig Problems Run Into Big Money

BABY PIG problems cost farmers of this country nearly a half-billion dollars a year, with the three worst killers being anemia, scours and TGE (transmissible gastro-enteritis).

The toll of baby pig diseases is so great that a special effort will be made in February by the National Livestock Loss Prevention Year program. There will be emphasis on how to take preventive steps against occurrence of disease.

Anemia is the result of deficiencies of iron and copper in the ration of young pigs, according to the American Foundation for Animal Health, Des Moines. One of the newest methods of prevention is to have a sow's udder painting a sow's udder in a pen.

Scours can be caused by a virus, or brought on by inadequate rations. However, pigs chilled

Warning On Hog Disease

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Brucellosis Is Threat To Swine Producers NOW!

This is the season when hog raisers should be taking steps to eliminate the hazard of brucellosis in their swine herds, according to a bulletin issued today by the American Foundation for Animal Health.

One of the most effective preventive steps, veterinary medical authorities said, is to make certain that boars being purchased for breeding the spring pig crop are free of the disease. This is similar to brucellosis in cattle.

The Foundation suggested that farmers buy boars only from herds known to be free of the disease. If that is not possible, the Foundation urged farmers to have a veterinarian test newly-purchased boars for brucellosis. The boars should then be kept separate from the home herd for about 30 days and then tested again before being used in a breeding program.

Brucellosis may cause the premature birth of dead pigs or the birth of pigs which are so weak that they die in a short time.

Danger Season For Cattle Dysentery

Biting, northerly winds which force cattle into lums for the winter also usher in the danger season for winter dysentery of cattle, the American Foundation for Animal Health warned today.

This disease may affect both beef and dairy cattle housed during the months of November to March. Veterinary medical authorities said that while winter dysentery may spread rapidly through a herd, causing substantial economic loss, the actual death

Winter

Soil Organisms Cause Animal Loss

Hidden killers which live on for years in the soils of pastures and barnyards, are now costing farmers over $20,000,000 a year in livestock losses.

That report issued today by American Foundation for Animal Health, cautioned animal owners of these disease organisms of the "clostridial" group cause their

Ten Point Plan For Winterizing Livestock Given

A 10-point program for "winterizing" livestock was recommended to farmers today by the American Foundation for Animal Health.

Highlights of the plan, designed to provide better winter health and production are:

1. Check sanitation and ventilation facilities of hog and poultry houses to guard against pneumonia and other respiratory diseases.

2. Exercise caution in allowing cattle into drouth-stricken fields of corn, Sudan grass or cane, since veterinarians may remind

Farmers Are Alerted On Swine Problems

This spring, farmers need to be more alert than ever against losses caused by swine erysipelas, according to a report issued last week by the American Foundation for Animal Health.

This disease has now become the No. 1 swine problem in some states, the report says. Nationally, it ranks second only to hog cholera, and causes farm losses of over $25,000,000 per year. The problem has grown to such an extent that it has been singled out as this month's prime target for National Livestock Loss Prevention Year.

Farmers were cautioned to watch for such symptoms as constipation, weakness, loss of appetite, a stiff gait, or a tendency to remain in quarters. A prompt diagnosis is important if an outbreak is to be controlled.

In areas where erysipelas has become a problem, authorities recommend a herd vaccination program. Selection of the program and type of vaccine to be used should be left to a veterinarian.

In buying replacement animals, farmers should check the health record of the farm from which they come, or should isolate new stock for 30 days in

SHIPPING FEVER TAKES TOLL

Farmers at this time of year need to watch out for a fall which may ... vement of ... from the ... according ... the Amer... Annual ... "guest" is ... annually ... 000 among ... ase acts on ... al like flu ...

FARMERS URGED TO WATCH HOGS FOR BRUCELLOSIS

... Animal ... al owners ... s is the season when hog ... g should be taking steps to ... ate the hazard of brucellosis ... g swine herds, according to ... latin issued today by the ... ican Foundation for Animal ...

One of the most effective pre... ... steps, veterinary medical ... rities said, is to make certain ... ers are ... ased boars being purchased for ... auses this disease, which is similar ... the object for a time ... ve, as part ... ome herd ... : Loss Pre... ney should ... roundings, ... tion can be ... of pure, ... ld be fed ... where they ... ld be fed ... Although ... rubber ...

Hidden Killers Cost Farmers $20,000,000!

Hidden killers which live on ... ... years in the soils of pastures ... and barnyards, are now costing ... farmers over $20,000,000 a year ... in livestock losses.

Soil Organisms Cause Animal Loss

Hidden killers which live on for years in the soils of pastures and barnyards, are now costing farmers over $20,000,000 a year in livestock losses.

That report issued today by American Foundation for Animal Health warned of certain disease organisms of the "clostridial" group cause their greatest losses during summer. Officials said that other during the spring pig crop are ... months just ahead.

These killer organisms are the ... shipevent or other arrival at the ... use of such livestock diseases as ... feed lot, feeder lambs may de... lockjaw, blackleg, malignant ... velop contagious sore mouth, coc... and enterotoxemia. The or... cidosis, shipping fever, or inter... are generally enter the ... nal parasite trouble. ... while grazing or through Veterinary medical authorities ... lb. Losses are no heavy from said vaccination is effective in ... causes that authorities have preventing ...

Farmers Warned About Hazards of Lamb Disease

... — The move-h ... s will be ... parts of the country soon will be ... starting and the American Foun... dation for Animal Health warned ... Monday of certain dis... ling the ... of the ... disease, which is similar ... cattle.. ... Foundation suggested that ... ers buy boars only from herds ... to be free of the disease. ... t is not possible, the Foun... urged farmers to have a ... laria... test newly-purchased ...

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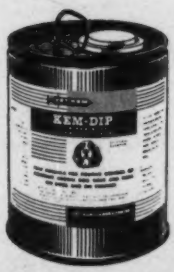

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TAKE TIME TO LIVE

Like many fellow veterinarians this reporter sneaked out and let the phone calls pile up for a couple of hours last week to dust off the fishing gear. The equipment looks a lot shabbier than I remembered it when it was put up last fall but I guess it will do until we find time to stop by and see what the latest gimmicks are to take a poor fisherman's money this year.

The fly line didn't look like it could take much but considering the number of big ones this unlucky soul runs into it seemed safe to get it wet and see what shape it was really in. The water is still pretty dirty from the heavy melt off and if we get a few more heavy rains in this part of the country we could be fishing from house tops in a few days.

Nothing of any size seems to be interested in either live bait or artificial lures yet but it should be better in a few days and the sun is great. A kid came down the path with a turtle about a foot and a half across. This kid always manages to bring home something, even if it has to be a water moccasin.

After a couple hours away from the business public, I had no fish but the improvement of disposition was worth it.

I never cared much for Carp fishing but I saw some fellows working carp last year on light spinning tackle. They used some standard carp bait which they make out of dry cereal and blackstrap molasses. A carp isn't the easiest fish in the world to catch but these guys sure were having a time trying to work a 15 pounder in on one of those invisible lines. It looks like sport worth trying once. Why not knock off a little time soon and try your luck — the clients will appreciate you when you get back.

C.M.C.

Veterinary Calendar

Apr. 30-May 1. **Third Annual Florida Conference for Veterinarians,** symposium on Diseases of Young Animals. University of Florida, Gainesville, Florida. W. R. Pritchard, head, Department of Veterinary Science, University of Florida, Gainesville, correspondent.

May 3-4. **University of Pennsylvania,** annual Conference of Veterinarians, School of Veterinary Medicine, Philadelphia, Pennsylvania. W. H. Rhodes, D.V.M., program chairman.

May 10. **Eastern Iowa Veterinary Association,** 26th Annual All-Day Practitioners' Clinic, Hawkeye Downs, Cedar Rapids, Iowa.

May 19-21. **Kansas State University,** 22nd annual Conference for Kansas Veterinarians. School of Veterinary Medicine, Kansas State University, Manhattan, Kansas. M. W. Osburn, D.V.M., extension veterinarian.

Jun. 2-3. **Missouri State Board Examination.** Veterinary Clinic, University of Missouri, Columbia, Missouri. Dr. L. A. Rosner, Chairman, Veterinary Board, Box 630, Jefferson City, Missouri.

Jun. 2-3. **Texas Conference of Veterinarians,** 13th annual meeting. School of Veterinary Medicine, College Station, Texas. Dr. R. D. Turk, conference chairman.

Jun. 6-8. **Ohio Veterinary Medical Examination,** Sisson Hall, College of Veterinary Medicine, Ohio State University, Columbus, Ohio. Applicants must be present at 8:00 A.M. on the first day. Applicants may secure application forms from the office of the Dr. H. G. Geyer, Executive Secretary, Ohio Veterinary Medical Board, Room 720, Ohio Departments Building, Columbus 15, Ohio. All application forms must be returned to the Secretary not later than May 6, 1960.

Jun. 20. **West Virginia Veterinary Board,** examinations for state license. Capitol Bldg., Room E-116 Ground Floor, East Wing, Charleston, West Virginia. Dr. Henry J. Fallon, secretary-treasurer, 200 Fifth Street West, Huntington, West Virginia.

Jun. 20-21. **Michigan State Board of Veterinary Examiners,** examination for state license at Lansing, Michigan. Corresponding Secretary, 641 Lewis Cass Bldg., Lansing 13, Michigan.

Jun. 20-21. **North Carolina Veterinary Medical Association.** Fifty-ninth annual summer meeting. Grove Park Inn, Ashville, North Carolina. J. T. Dixon, 3026 South Main Street, Winston-Salem, North Carolina, secretary-treasurer.

Jun. 20-22. **North Carolina State Veterinary Examining Board,** examinations for a license in North Carolina. Grove Park Inn, Asheville, North Carolina. Dr. James I. Cornwell, P. O. Box 9038, Asheville, secretary-treasurer.

Jun. 22-24. **Massachusetts Board of Registration,** examination for registration, University of Massachusetts, Amherst. Dr. Edward A. Zullo, Secretary, Board of Registration in Veterinary Medicine, Room 33, State House, Boston 33, Massachusetts.

Jun. 23-24. **Maryland State Veterinary Medical Association,** summer meeting. George Washington Hotel, Ocean City, Maryland. Dr. Harry L. Schultz, Jr., secretary.

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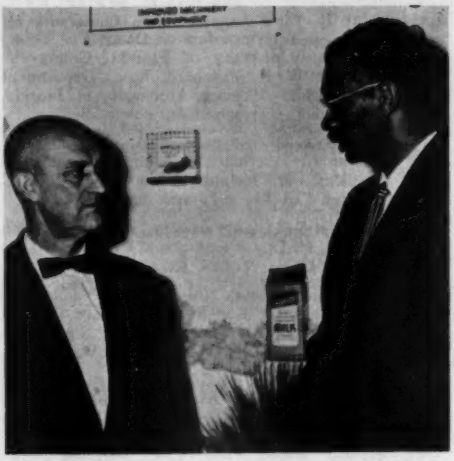
Clarkson Visits Tuskegee



Bringing Dr. M. R. Clarkson up to date on innovations in the program at the Tuskegee Institute School of Veterinary Medicine, Dr. T. S. Williams (D.V.M.), dean, has the rapt attention of the U. S. Department of Agriculture administrator during the 69th Annual Farmers Conference, held recently on the Alabama campus. Dr. Clarkson addressed some 2,000 farm men and women from 16 southern states, advising them of the necessity of "shifts" from cotton and other crops to livestock in Southern agriculture.

Henderson to Florida

The transfer of Dr. Forrest E. Henderson from Mexico City, Mexico, to Sebring, Florida, effective June 18, 1960, as Federal Director of the joint State-Federal Screwworm Eradication Program, is announced by Dr. R. J. Anderson, Director of the Animal Disease Eradication Division.

Previous to this time, Dr. Henderson was stationed for two years at Mexico City, D. F., as co-director of the Mexico-U. S. Commission for Prevention of Foot-and-Mouth Disease. He has spent ten years in Mexico in connection with livestock disease control and eradication work being carried on jointly by the Mexican and U. S. governments.

THE TAPE RECORDER . . . . A NEW PROFESSIONAL TOOL

T. M. EAGLE, D.V.M.
Kansas City, Missouri

According to the World Book wire recorders were invented about 1898 by a Danish inventor. During and following World War II considerable improvement was made until we have the moderately priced equipment of today. The wire recorder depends upon sound waves being changed to varying electrical impulses which when passed through an electromagnet are capable of magnetizing a passing wire to these varying degrees. The value of this process is dependent upon the wire being passed over and over a receiving electromagnet and faithfully reproducing these electrical impulses each time. These electrical impulses are amplified to intelligible audio waves. Thin metalized plastic tapes are also popular for faithfully reproducing sound. The wire or metalized tapes can be erased and reused.

How does this interest the veterinarian? More and more practices have two and three veterinarians on the staff. Not all can leave to attend every veterinary meeting of interest, so one member takes the tape or wire recorder to the meeting and records the scientific program of choice. The tape is returned to the office for the benefit of fellow staff members to hear at home or during leisure hours.

This keeps all professional personnel equally informed. Many veterinary medical lectures and demonstrations are being done on closed circuit TV. With dark rooms, notes are difficult to take but the recorder faithfully continues to take down the subject matter for review and permanent note taking at a more opportune time. Lengthy lectures can be organized, edited and evaluated under separate headings in the office tape library.

This requires a second recorder, usually an inexpensive or used model. For this purpose two veterinarians can go together and realize a profitable return from their investment. We find assembling our tape recordings, making necessary permanent notes for file and reusing the tape to be preferred.

Several things must be kept in mind for good tape recording, whether for permanent or temporary reference. Wire recorders will run the longest unattended.

We use the MINIFON P55, Leiss-America, Chicago, Ill., importers from Germany, retail price $270. It will run 4 hours per spool of wire and does a pretty good job. Tape recorders will possibly give a clearer reproduction, especially those having a distortion light. This light flashes when the volume is turned too high or if the volume is too low, no light will be shown. We use a Wollensak No. T1500 tape recorder which costs about $199.00 retail and has everything you would possibly need on a recorder. Tape recorders with half track in stereo will not record on both sides of the tape. Most tape recorders operate at two speeds. 3¾ inches per second is best suited to voice reproduction and tape space saving per spool; 7½ inches per sec. is best suited for music reproduction. Whatever tape equipment you purchase, the cheaper the price the cheaper the results, as in everything else. We recommend thin double strength Scotch No. 200-24 Tensilized Polyester Tape which is ½ ml. thick. Cheap tape stretches, breaks or is so thick you are unable to get a desirable amount on a spool. 1½ ml. thick is usually the least expensive. The Wollensak 2400 ft. spool will record

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(continued from page 113)

about 2 hours on each side of the tape, but the machine must be watched in order to turn the spool at the end of the first two hours and electrical outlets are required. The Minifon will operate successfully from small batteries or a plug in transformer. If the lecture room has poor acoustics, no form of expensive equipment will overcome it. Some speakers talk loud and some talk soft, some jumble their words and others talk very clear and distinct. Tapes made during an illustrated lecture are difficult due to the blank spots in the recording. We find placing the recorder microphone on the speaker's table or in front of the public address speaker gives good results; however, plugging the recorder into the TV or room P-A system is better and noise free. Front seats at the lecture are good providing there are not a couple of visiting members close to the microphone. Your recorder picks up all noises and does not have the ability to separate those sounds desired.

A number of veterinarians throughout Canada and United States and a few in England are exchanging tape recordings made at local meetings. The information thus passed on is interesting and informative. Many outstanding lectures appear in print in 3 to 6 months, but if you want to be first in what's new, the tape recorder is the answer. There are now available several tape recordings of normal and abnormal heart sounds, respiratory sounds and abdominal sounds which are nice to have on hand for ready reference.

A few disadvantages of tape recordings are that poor noisy recordings are worse than none at all. Accidentally erasing an important lecture by recording over it is a problem and tapes must be filed and identified carefully to save time. Veterinarians who would like to participate in some form of audio digest on veterinary subjects are invited to contact the editor of *Veterinary Medicine* for further information.